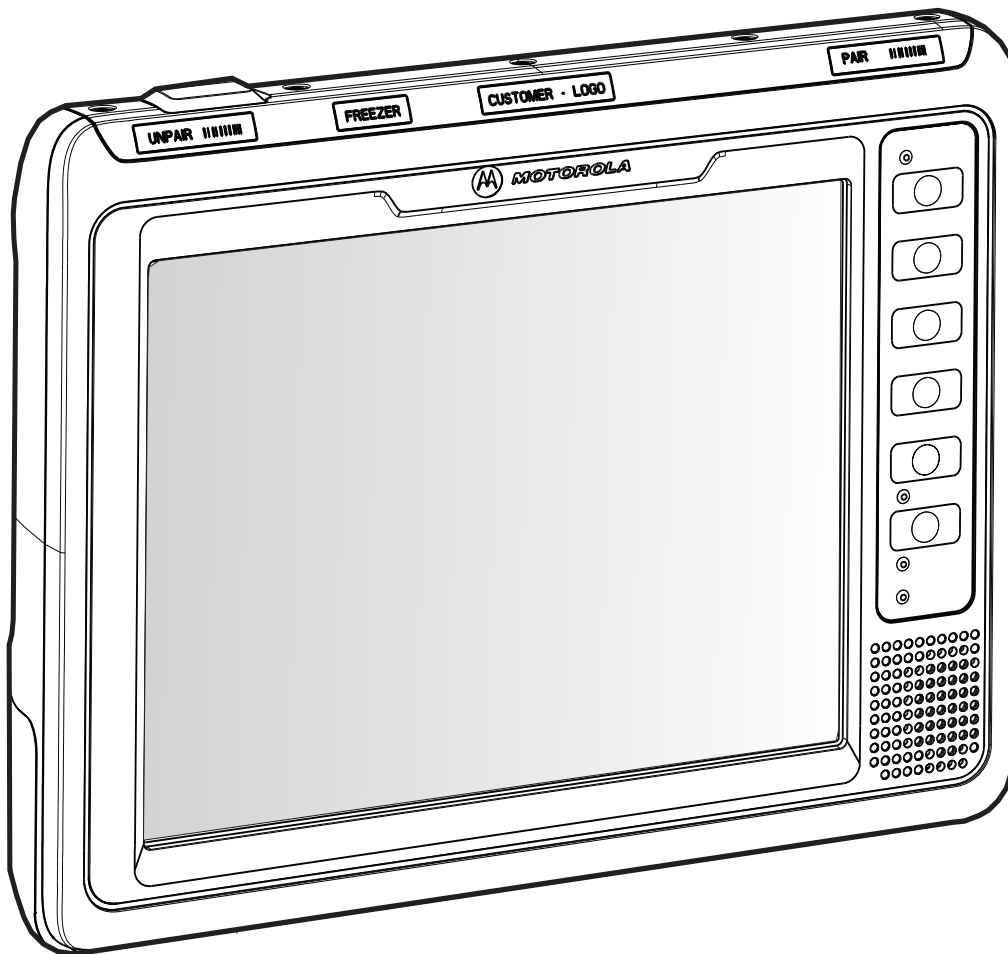




VC70N0 Vehicle Computer

Product Reference Guide



VC70N0 Vehicle Computer

Product Reference Guide

72-164686-01

Revision A

November 2012

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Warranty

Subject to the terms of Motorola’s hardware warranty statement, the VC70 Vehicle Computer products are warranted against defects in workmanship and materials for a period of one year from the date of shipment. For the complete Motorola hardware product warranty statement, go to: <http://www.motorolasolutions.com/warranty>.

Revision History

Changes to the original manual are listed below:

Change	Date	Description
-01 Rev A	11/30/12	Initial release.

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About This Guide

Introduction

The *VC70 Product Reference Guide* provides information about the VC70 vehicle computer using Microsoft® Windows® CE 7.0 operating system and its accessories.



NOTE Screens and windows pictured in this guide are samples and can differ from actual screens.

Documentation Set

The documentation set for the VC70 is divided into guides that provide information for specific user needs.

- **VC70 Quick Reference Guide** - describes how to install and use the VC70 vehicle computer.
- **VC70 Product Reference Guide** - provides an in-depth description on how to use and setup the VC70 vehicle computer and its accessories.
- **Microsoft Application Guide** - describes how to use Microsoft developed applications that reside on the VC70 vehicle computer.
- **Symbol Application Guide** - describes how to use Symbol developed applications available for the VC70 vehicle computer.
- **SMDK Help File** - provides API information for writing applications.

Configurations

This guide covers the following configurations:

Configuration	Radios	Display	Memory	Data Capture	OS	Keypad
VC70 Full Screen	WLAN: 802.11a/b/g/n WPAN: Bluetooth	10.4" XGA 1024 x 768 Switchable to SVGA 800x600 (4:3 format)	512MB DDR2 volatile memory, 4GB EMMC non volatile memory	Optional Scanner	Windows CE 7.0 Professional	Optional USB QWERTY or AZERTY keyboard

Software Versions

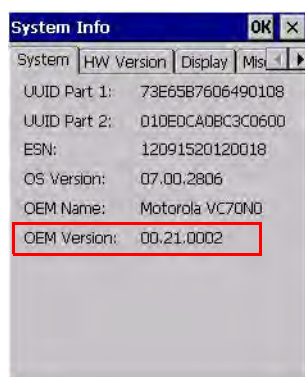
This guide covers various software configurations and references are made to operating system or software versions for:

- OEM version
- Fusion version.

OEM Software

To determine the OEM software version:

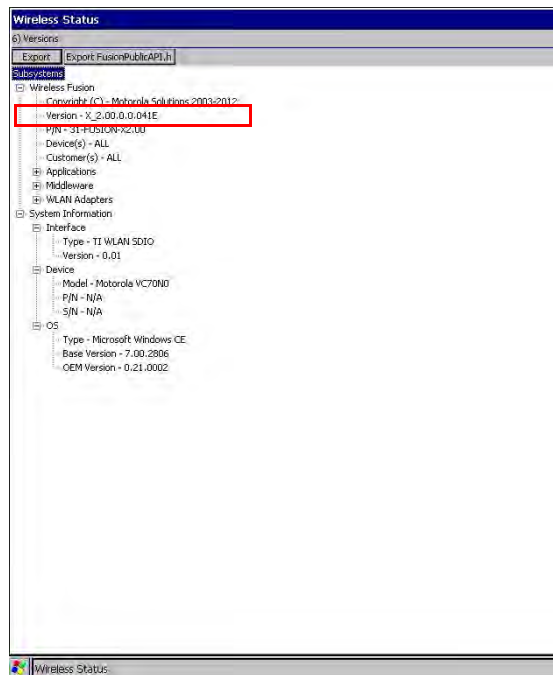
Tap **Start > Settings > Control Panel > System Information icon > System** tab.



Fusion Software

To determine the Fusion software version:

Tap **Fusion icon > Wireless Status > Versions**.



Chapter Descriptions

Topics covered in this guide are as follows:

- [Chapter 1, Getting Started](#), provides information on getting the vehicle computer up and running for the first time.
- [Chapter 2, Installation](#), provides instructions for installing the vehicle computer in a forklift, on a wall or on a desktop. Provides instructions for installing accessories.
- [Chapter 3, Operating the VC70](#), explains how to use the vehicle computer. This includes instructions for powering on and resetting the vehicle computer, entering and capturing data.
- [Chapter 4, Wireless Applications](#), provides instructions for using and configuring the mobile computer on a wireless network.
- [Chapter 5, Using Bluetooth](#), explains how to use Bluetooth functionality on the vehicle computer.
- [Chapter 6, ActiveSync](#), provides instructions for installing and configuring ActiveSync.
- [Chapter 7, Application Development and Deployment](#), provides instructions for installing the SDK for C on the host computer and downloading software files to the vehicle computer.
- [Chapter 8, Staging and Provisioning](#), provides instructions for staging and provisioning the vehicle computer.
- [Chapter 9, Software Configuration](#), includes special configuration instruction for third party software used with the vehicle computer.
- [Chapter 10, Maintenance](#), includes instructions on cleaning and storing the vehicle computer, and provides troubleshooting solutions for potential problems during vehicle computer operation.
- [Appendix A, Specifications](#), includes a table listing the technical specifications for the vehicle computer.

Notational Conventions

The following conventions are used in this document:

- “Vehicle computer” refers to the VC70 series of vehicle computers.
- *Italics* are used to highlight the following:
 - Chapters and sections in this and related documents.
- **Bold** text is used to highlight the following:
 - Key names on a keyboard
 - Button names on a screen
 - Dialog box, window and screen names
 - Drop-down list and text box names
 - Check box and radio button names
 - Icons on a screen.
- 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 and Software

The following documents provide more information about the VC70 vehicle computers.

- *VC70 Quick Reference Guide*, p/n 72-76346-xx

For the latest version of this guide and all guides, go to: <http://supportcentral.motorola.com>.

Service Information

If you have a problem with your equipment, contact Motorola Enterprise Mobility support for your region. Contact information is available at: <http://supportcentral.motorola.com>.

When contacting Enterprise Mobility support, please have the following information available:

- Serial number of the unit
- Model number or product name
- Software type and version number.

Motorola responds to calls by email, telephone or fax within the time limits set forth in support agreements.

If your problem cannot be solved by Motorola Enterprise Mobility Support, you may need to return your equipment for servicing and will be given specific directions. Motorola 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 you purchased your Enterprise Mobility business product from a Motorola business partner, contact that business partner for support.

Returning the Vehicle Computer for Service



NOTE Motorola has taken great care to ensure environmental conditions such as humidity will not affect the stability of the vehicle computer. This is accomplished by means of desiccant bags which can be inserted by the user upon receipt of the vehicle computer. In the event, the vehicle computer needs to be shipped by air carrier to Motorola for repair or maintenance, it is essential that the user remove the desiccant door cover before the vehicle computer is packaged for shipment. The reason for this step is to avoid compromising the vehicle computer as a result of pressurization during air transit. The user must simply remove the screws associated with the desiccant door on the back of the unit. Discard the used desiccant bags. Upon receipt of the repaired vehicle computer, the user should insert new desiccant bags (if used) and reseal the doors using new screws.



Chapter 1 Getting Started

Introduction

The VC70 is Motorola's ultra-rugged forklift mounted computer. It is designed to maximize productivity in harsh environments. Its rugged construction and high-performance wireless networking enables real-time data access and collection in a wide range of environments — from the loading dock and freezer to the warehouse.

The VC70's compact design improves visibility and reduces safety concerns while retaining large screen size (10.4"). Its 802.11 a/b/g/n WLAN provides real-time information that improves decision making, reduces errors, and enhances productivity. Its rugged design with integrated shock-mount and MIL-STD 810 military rating for shock and vibration ensures dependable operation in challenging environments. Its IP66 sealing, display, defroster and wide temperature range ensure operation in and out of -30°C freezer storage warehouse.

With its high-resolution and high-brightness display, the VC70 provides the user access to more information in low ambient light warehouse and outdoors.

The VC70 accessories allow backward compatibility with the VC5090 for easy and gradual migration.

Unpacking the VC70

When you remove the vehicle computer from its box, save the box and shipping material in case you need to ship or store the vehicle computer. Check the contents of the box against the invoice for completeness and contact your local Motorola service representative if there is a problem.

The VC70 shipping box contains:

- vehicle computer
- VC70 Quick Reference Guide

Features

The VC70 has the following features:

- Integrated 802.11a/b/g/n wireless LAN radio

- Windows® CE 7.0 Professional Operating System
- TI OMAP4430 processor at 1GHz in turbo mode CPU
- 512MB DDR2 volatile memory, 2GB EMMC non volatile memory
- 10.4" XGA 1024 x 768, Switchable to SVGA 800x600, (4:3 format) color display
- Wireless and wired printing
- Integrated antennas
- Integrated speaker.

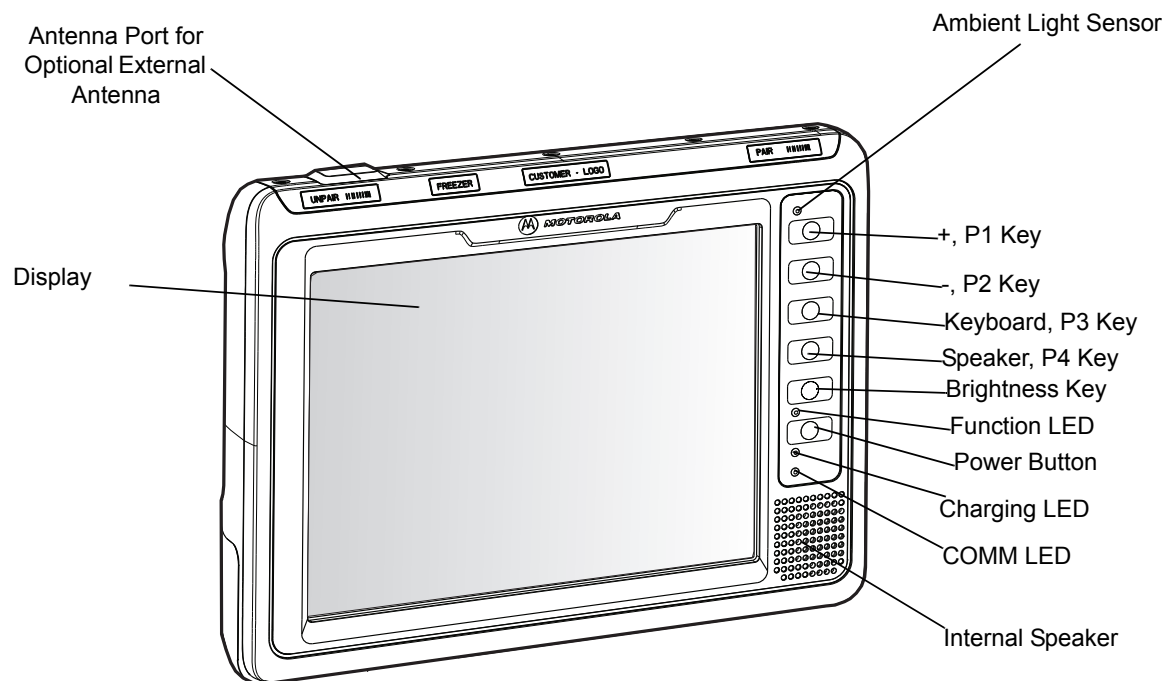


Figure 1-1 VC70 Front View

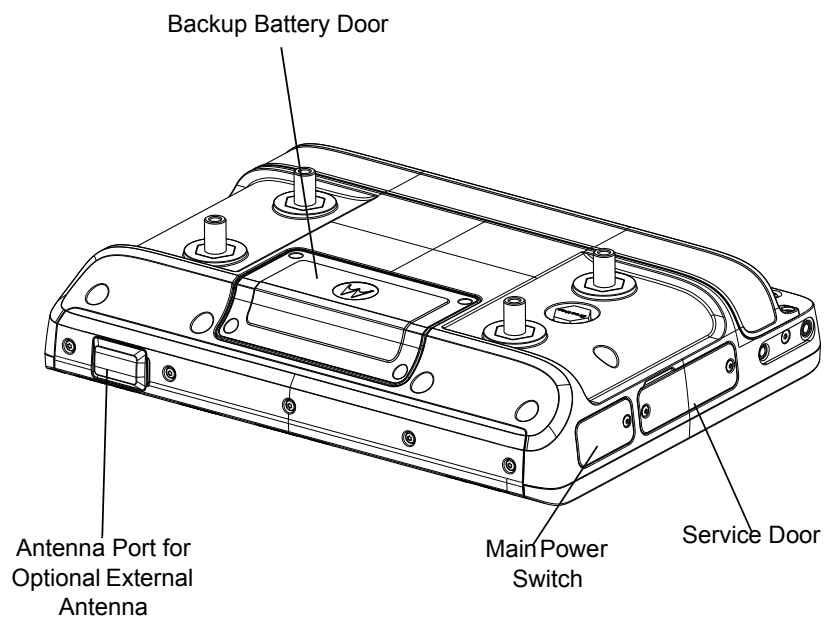


Figure 1-2 VC70 Back View

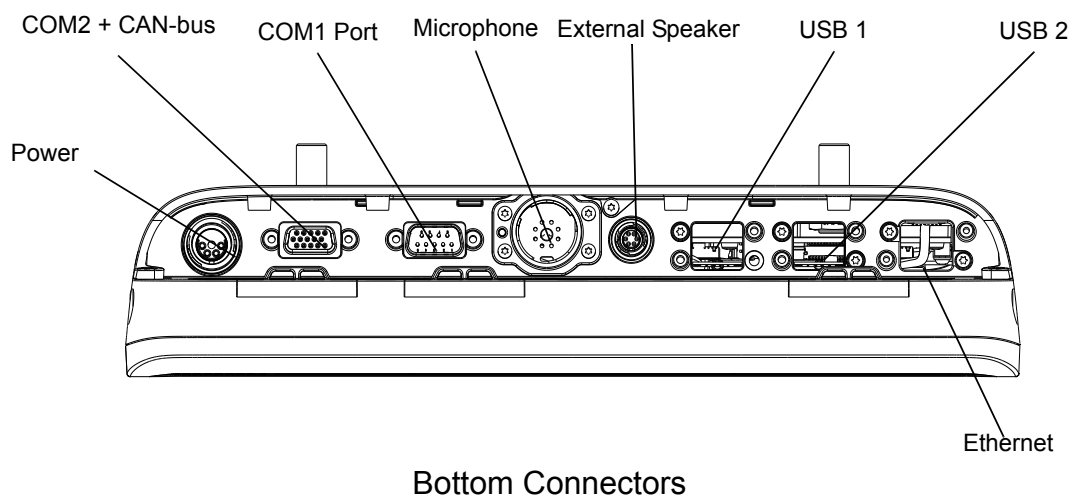


Figure 1-3 VC70 Bottom View

Accessories

Table 1-2 lists the accessories available from Motorola for the VC70:

Table 1-1 *Accessories*

Accessory	Description	Part Number
Scanners		
Corded scanners	• LS3408-ER Rugged barcode laser scanner (serial/USB)	LS3408- ER20005R
	• DS3508-ER Rugged 1D/2D imager scanner (serial/USB)	DS3508-ER20005R
	• DS457 Fixed mount imager scanner (serial/USB)	DS457-SR20009
Wireless scanners	• DS3578-ER Rugged cordless 1D/2D imager scanner (bluetooth)	DS3578-ER2F005WR
	• LS3578-ER Rugged barcode scanner (bluetooth)	LS3578-ER20005WR
	• RS507 Hands free cordless imager (bluetooth)	RS507- IM20000XXWR
Speakers		
External Speaker/Microphone	Motorola HSN4040A Water-resistant loudspeaker.	HSN4040A
	Motorola HMN1089B Water-resistant Palm Microphone or equivalent.	HMN1089B
Printers		
	O'Neil, Microflash Series MF 2T, Easy Print.	200380-100
	Zebra, RW420, Zebra, ZPL II, CPL, EPL2.	R4D-0UGA000N-00
Power Supplies		
	Input Voltage: 9.0-60VDC	PWRS-9-60VDC-01R
	Input Voltage: 110-240VAC	PWRS-14000-241R
Keyboards		
External Keyboard	Keyboard, QWERTY, 64-key Backlit, IP66, secured USB-A, VC70.	KYBD-QW-VC70-01R
	Keyboard, AZERTY, 64-key Backlit, IP66, secured USB-A, VC70.	KYBD-AZ-VC70-01R
	Keypad, Numeric, 21-key Backlit, IP66, secured USB-A, VC70.	KYBD-NU-VC70-01R
	VC5090 KYBD Mounting and Cable Adapters, VC70	KT-VC50KYBD-ADPT-R

Table 1-1 Accessories (Continued)

Accessory	Description	Part Number
Cables		
	USB cable for DS3508-ER, LS3508-ER Scanners, Coiled, 12', sealed and secured USB connector.	25-159548-01
	DC cable extender. 6.5'.	25-159549-01
	DC output cable for AC power supply PN: PWRS-14000-241R AC power supply adapter cable, 6.5'.	25-159550-01
	Cable, external power supply to vehicle battery, 10', includes fuse kit, VC70 (9-60VDC). Use with PWRS-9-60VDC-R	25-159551-01
	Speaker cable adapter, for HSN4040A.	25-159552-01
	DC Power bridge. Cable, external power supply to existing VC5090 power cable (25-71919-03R or 25-71919-04R), 2'.	25-159553-01
External Antenna		
	External Roof-mounted Antenna.	8508851K46
AC Line Cords		

Table 1-1 Accessories (Continued)

Accessory	Description	Part Number
	US AC line cord, grounded, three wire for power supply 50-14000-241R.	23844-00-00R
	AC Line Cord, 1.8M, three wire, grounded BS1363 plug. Associated Countries: Hong Kong, Iraq, Malaysia, Singapore, United Kingdom. For power supply 50-14000-241R.	50-16000-219R
	AC Line Cord, 1.8M, grounded, three wire CEE 7/7plug. Associated Countries: Europe, Abu Dhabi, Bolivia, Dubai, Egypt, Korea, Russia, Vietnam. For power supply 50-14000-241R.	50-16000-220R
	AC Line Cord, 1.8M grounded, CIE 23-16 plug. Associated Country: Italy. For power supply 50-14000-241R.	50-16000-671R
	AC Line Cord, 1.8M, grounded, three wire, AS 3112 plug. Associated Country: Australia, China, New Guinea. For power supply 50-14000-241R.	50-16000-217R
	AC Line Cord, 1.8M, grounded, three wire, NEMA 1-15P plug. Associated Countries: Japan. For power supply 50-14000-241R.	50-16000-218R
	AC Line Cord, 1.8M, grounded, USA NEMA 5-15P. Associated Countries: Brazil, United States. For power supply 50-14000-241R.	50-16000-221R
	AC Line Cord, 1.8M, grounded,CEE7/7 plug. Associated Country: Korea.For power supply 50-14000-241R.	50-16000-256R
	AC Line Cord, 1.8M, grounded, three wire, IEC 60320 C13 plug. Associated Country: China.For power supply 50-14000-241R.	50-16000-257R
	AC Line Cord, 1.8 M grounded, three wire, BS 546 Plug. Associated Country: India. For power supply PWRS-14000-241R.	50-16000-669R
	AC Line Cord, 1.8M grounded, three wire, S132 Plug. Associated Country: Israel.For power supply PWRS-14000-241R.	50-16000-672R
	AC Line Cord, 36" grounded, three wire. Associated Countries: Brazil, United States.For power supply PWRS-14000-241R.	50-16000-678R
Micro SD Cards		
Micro Secure Digital Card	Up to 32G, SDHC Class 10 card	3rd Party

Chapter 2 Installation

Introduction

This chapter describes how to install the vehicle computer in a vehicle or on a desktop and connecting the vehicle computer to a power source. There are different installation options depending on the type of vehicle. This chapter also describes how to install the various accessories for the vehicle computer. Read all of the following instructions before you begin.



WARNING! The vehicle computer and bracket must be firmly secured to a surface that can support the vehicle computer's weight.



CAUTION A competent engineer must perform the installation in a vehicle. Improper installation can damage your vehicle and/or the VC70.

Do not install the vehicle computer in a location that will affect vehicle safety, driveability, or visibility.

Installing a Micro SD Card

A micro SD (Secure Digital) card provides secondary non-volatile storage. The card holder is located on the right side of the VC70 under the Service door.

To install the micro SD card:

1. Remove the two screws securing the Service door.

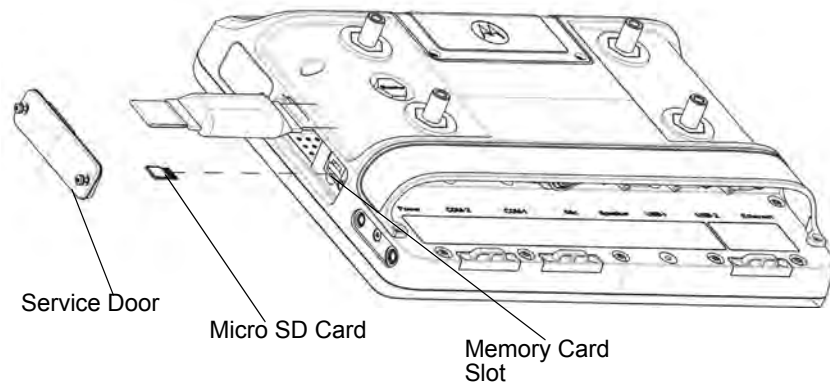


Figure 2-1 *Install Memory Card*

2. Push the memory card, with the contacts up, into the card slot until it locks.
3. Replace the Service door and secure using two captive screws.

CAUTION Ensure to torque the screws to seal the device properly. Otherwise, sealing can be compromised.

4. Torque the torx head screws to $4.0 \pm 10\%$ kgf-cm ($3.5 \pm 10\%$ lbs-in).

U Mount Installation

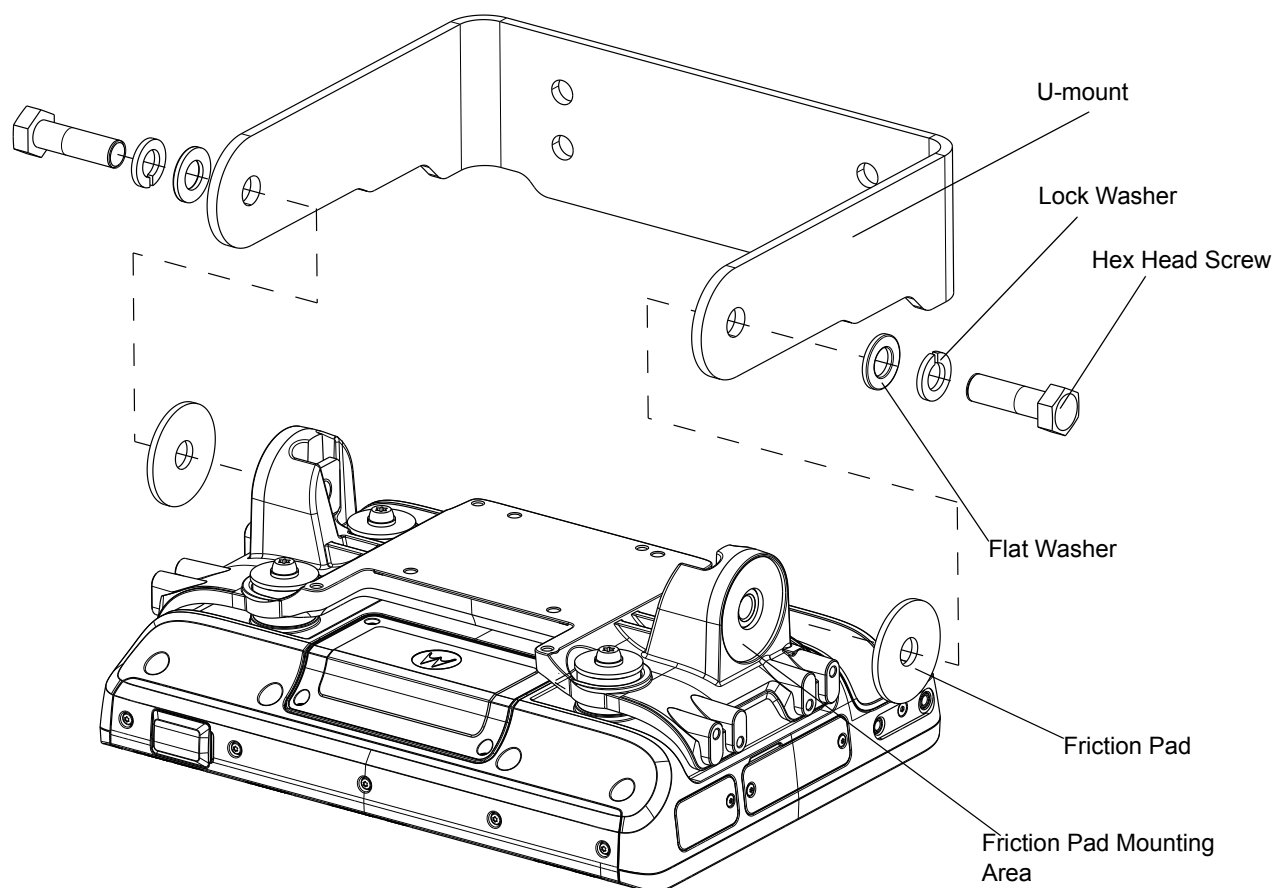


Figure 2-2 Mounting Bracket Installation

To install the U-mount:

1. Position the friction pads in the friction pad mounting area.
2. Position the U-mount over the mounting holes.
3. Place lock and flat washers onto cap screws.
4. Screw the M12x40mm hex head screws into mounting holes and tighten. Torque the hex head screws $350 \pm 10\%$ kgf-cm ($300 \pm 10\%$ lbs-in).

Installing the VC70 on a Forklift



CAUTION A competent engineer must perform the installation in a vehicle. Improper installation can injure the operator and damage your vehicle and/or the VC70.

Follow the instructions below to properly install the VC70 on a forklift.

- Determine the best location for mounting the vehicle computer taking into consideration the driver's field of view and ease of accessing the vehicle computer.
- Install the appropriate mounting hardware. The VC70 ships with four No. 8 Allen head screws (M10x50mm) for securing the mounting bracket. If the supplied cap screws are not long enough, use M10 - X stainless steel Allen head screws where X represents the length in millimeters of the required screws.
- Connect the vehicle computer to the vehicle's wiring system.

Positioning the Vehicle Computer

- Determine the best position for the vehicle computer and all the associated components. If a similar vehicle computer was previously installed, check to see if the position it used is suitable for the VC70.
- Test the installation for at least 30 minutes before installing on another vehicle. Record all details:
 - Check that the position of the vehicle computer does not obstruct vehicle controls.

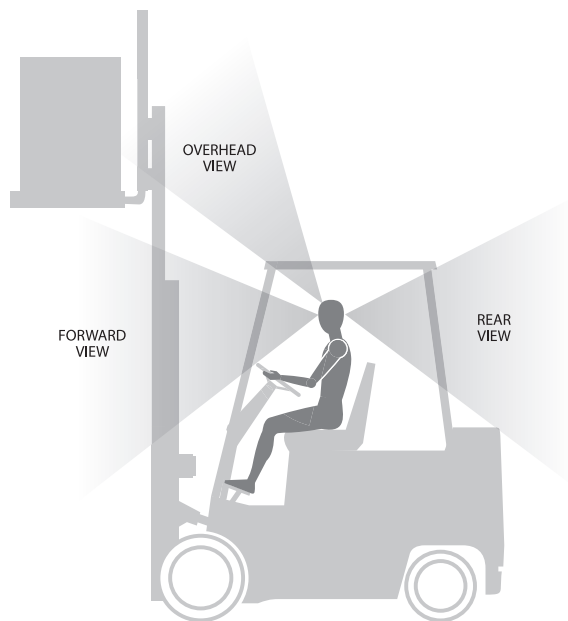


Figure 2-3 *View Obstruction*

- Check that the vehicle computer does not obstruct the driver's view.
- Check the position of the vehicle computer for user comfort over long periods.
- Check positioning to avoid extreme wrist angles that may cause injury.

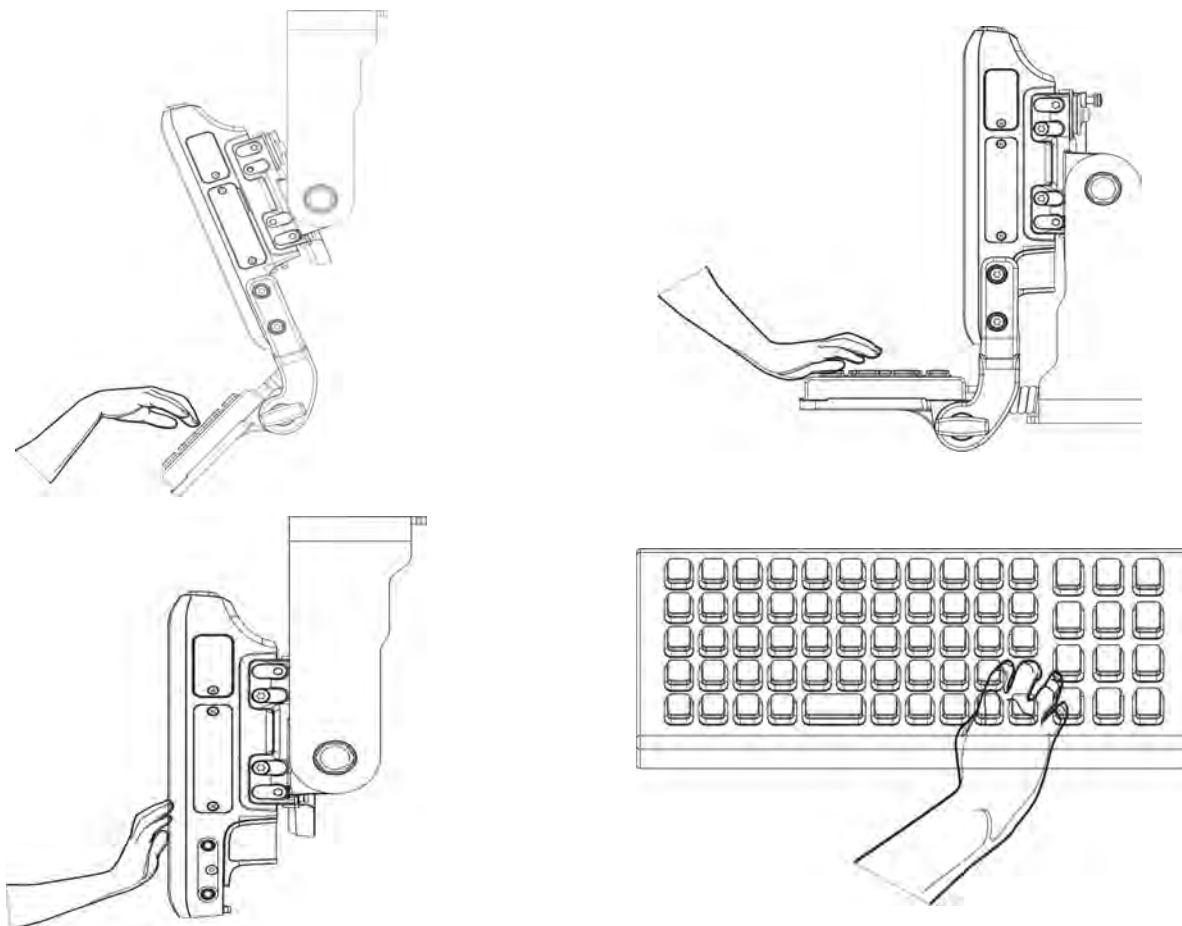


Figure 2-4 *Avoid Extreme Wrist Angles*

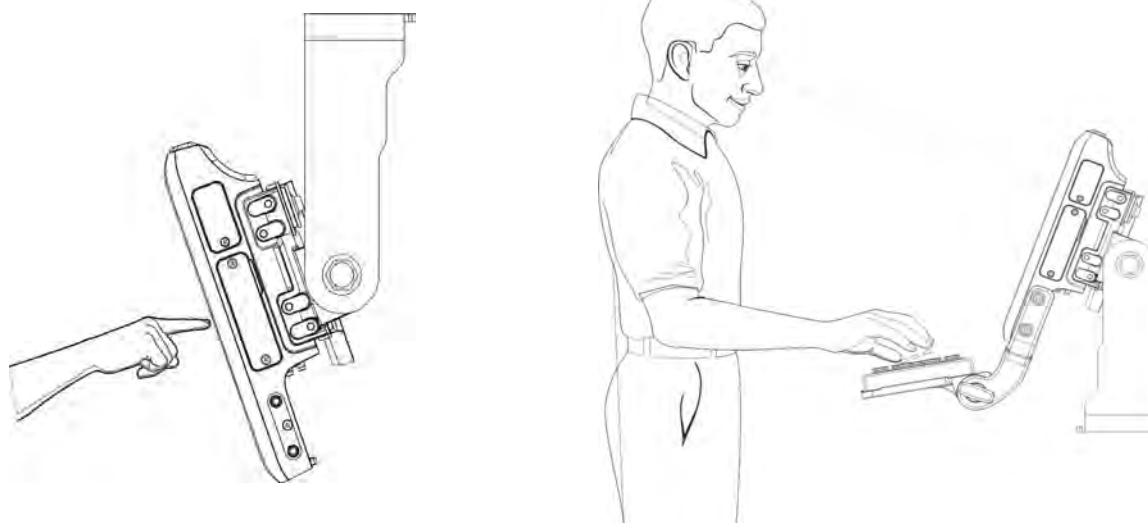


Figure 2-5 *Optimum Wrist Positions*

Mounting the Vehicle Computer

U-Mount Installation Template

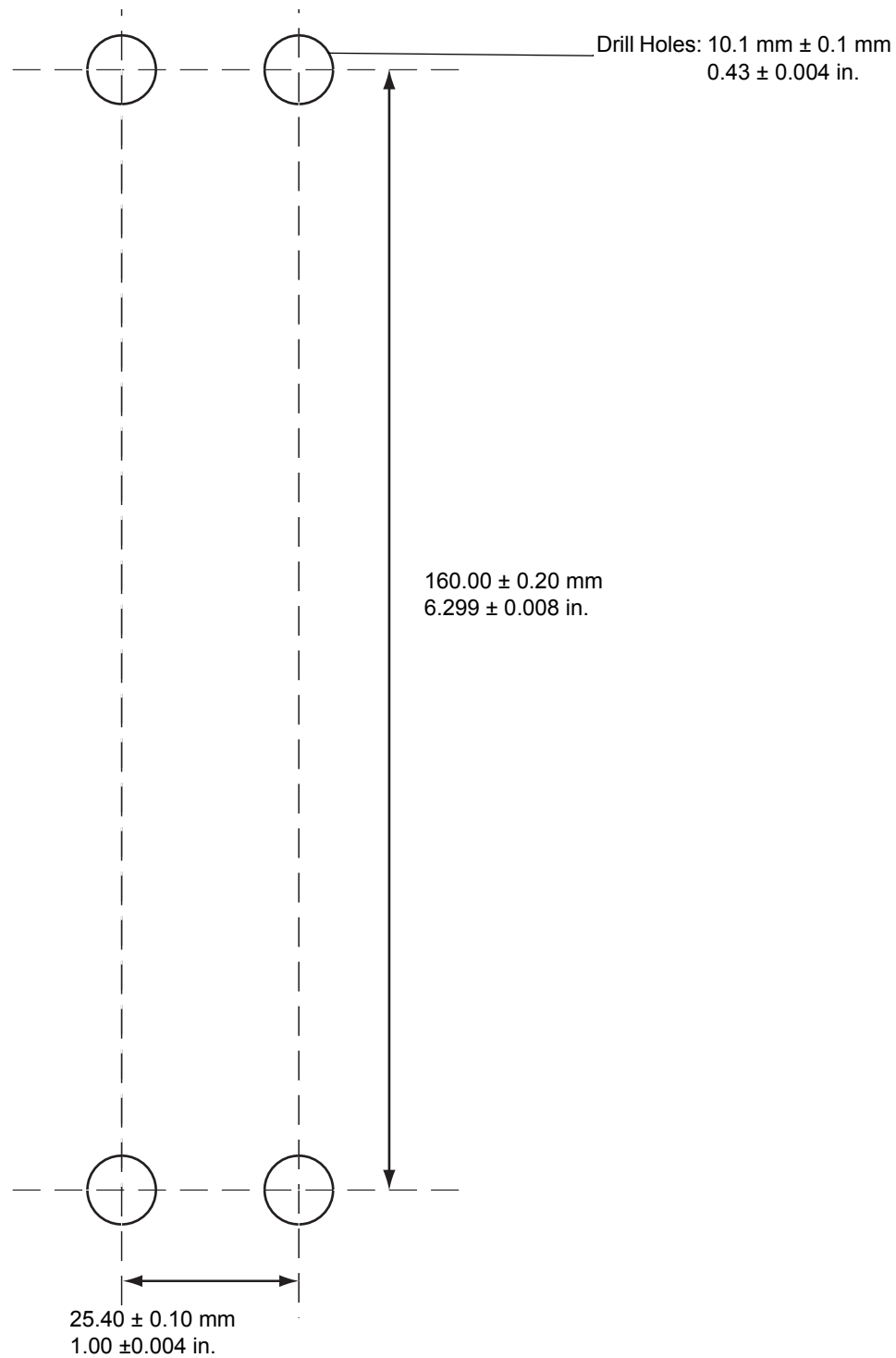


Figure 2-6 Mounting Template

Important Fixing Information



CAUTION Any modification to supplied mounting bracket could cause failure of the unit and/or mountings.

- Mounting surface must be flat and stiff and it must extend evenly for the entire length of the mounting bracket surface.
- All four mounting holes must be used.
- All nuts and bolts must be checked periodically and tightened if required.
- When installing the vehicle computer, care must be taken to ensure that the mounting bracket footprint is fully supported. Additional plates may be required to achieve this.
- Do not mount the vehicle computer with the mounting bracket perpendicular to a wall.

Mounting onto an Over-Head Cross-Beam Example

The diagram below illustrates a typical installation where the vehicle computer is mounted onto a cross-beam.

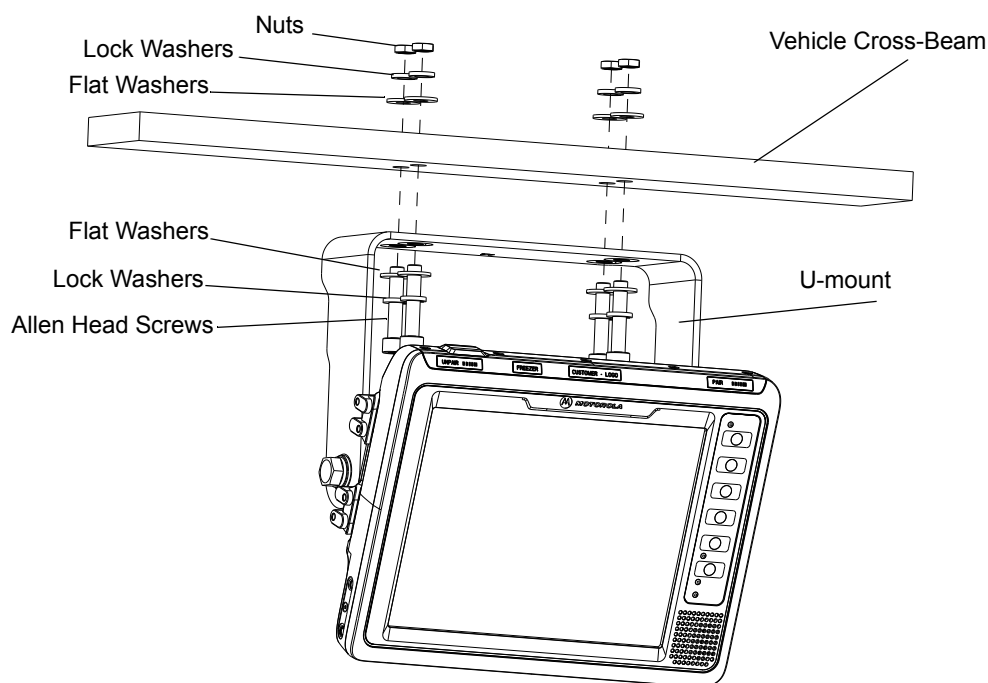


Figure 2-7 Mounting the VC70 onto an Over-Head Cross-Beam Example

Mounting onto an Over-Head Cage Example

The diagrams below illustrates a typical installation where the vehicle computer is mounted on an overhead cage. A customer supplied mounting plate must be used that can withstand the weight of the vehicle computer under vibration and shock. The plate must be made of stainless steel or hardened steel with the following dimensions: 3.0 in. (76.0 mm) wide, 8.66 in. (220.0 mm) long and 0.2 in. (5.0 mm) thick. The plate must be secured with hardware or to the underside of the cage by welding.

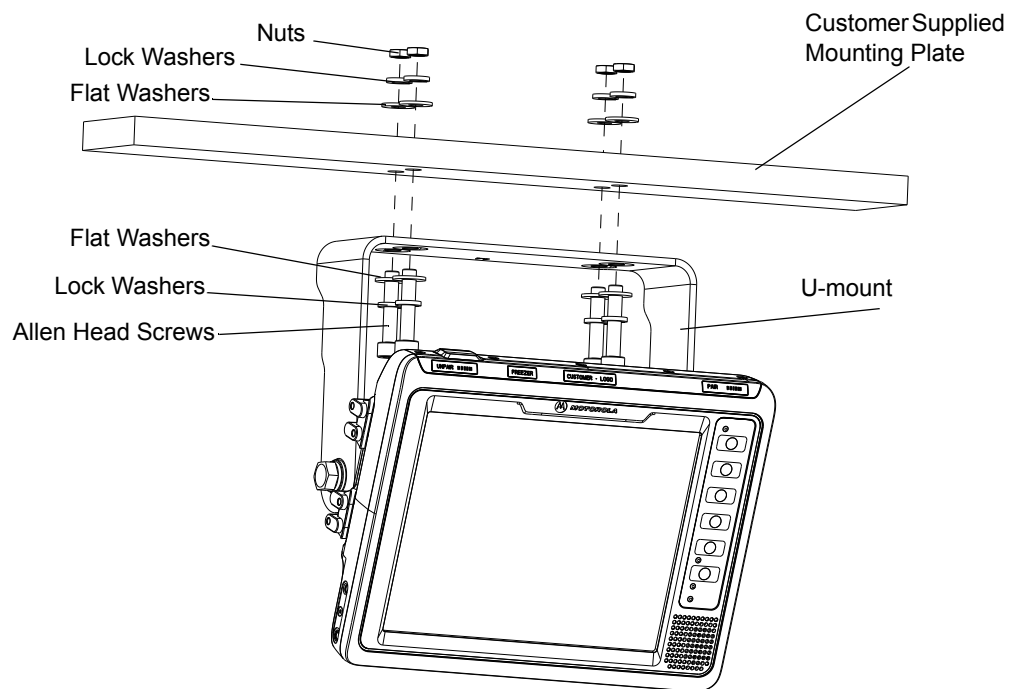


Figure 2-8 *Mounting on Flat Overhead Beams*

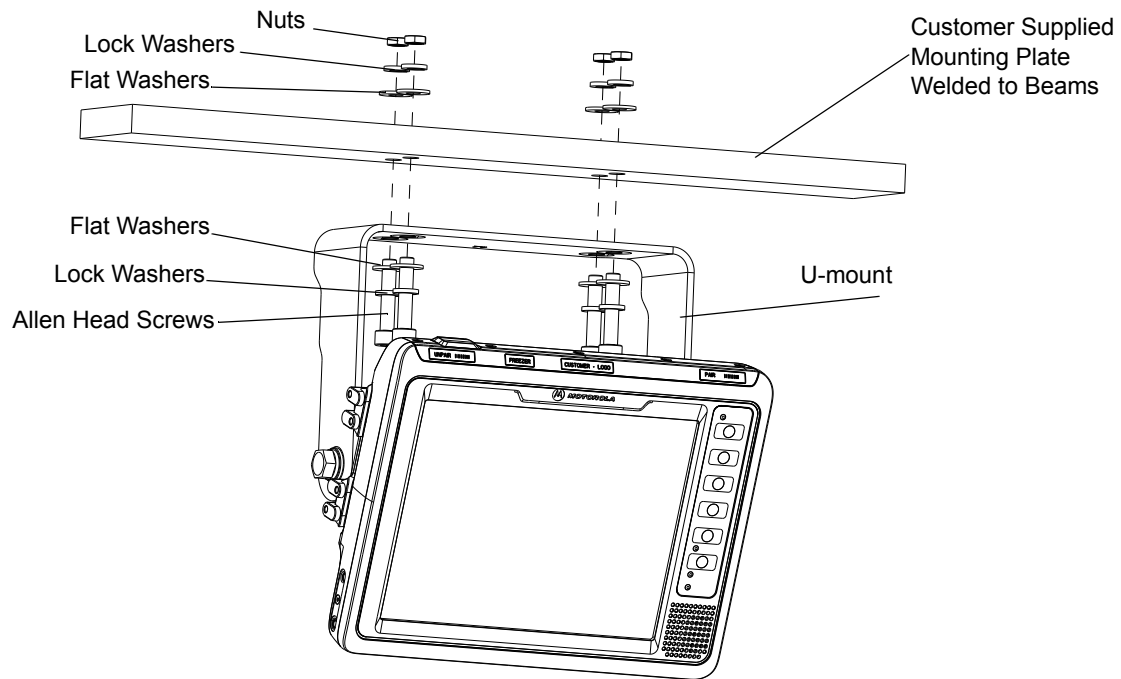


Figure 2-9 *Mounting on Transverse Overhead Beams*

Mounting on a Dashboard or Horizontal Surface Example

The diagram below illustrates a typical installation where the vehicle computer is mounted on a dashboard or horizontal flat surface.

✓ **NOTE** If mounting to a thin surface, a reinforcing plate maybe required.

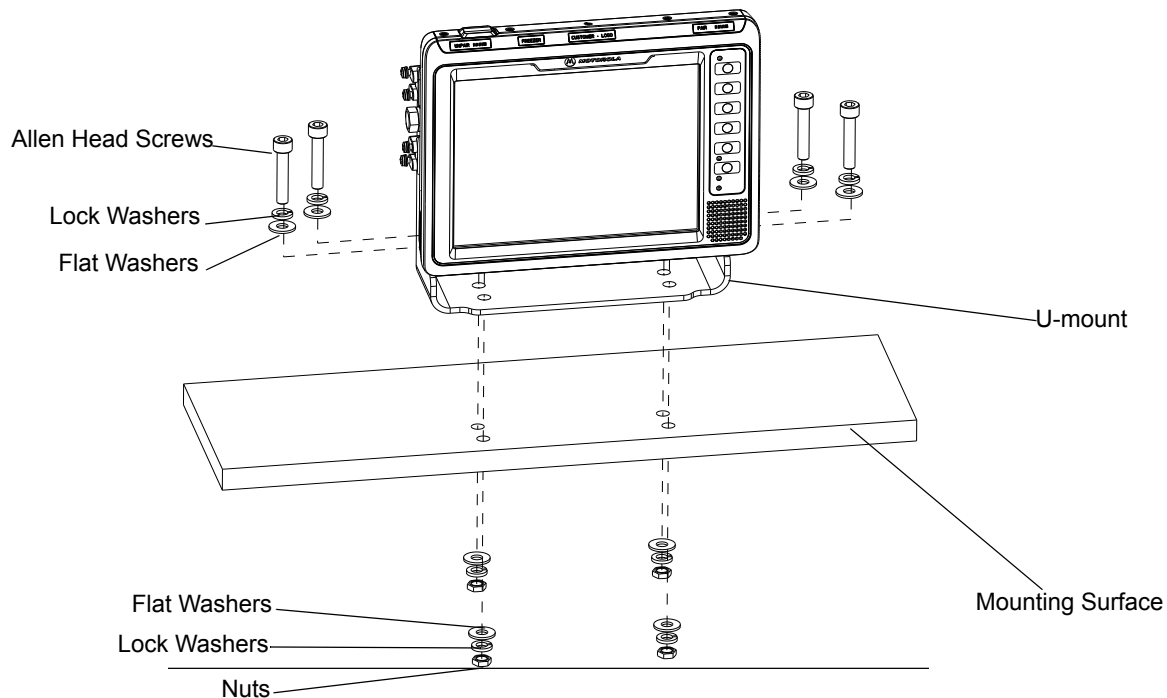


Figure 2-10 *Mounting on a Vehicle Dashboard*

Routing Electrical Cables

- Establish a neat route for the cable, staying clear of moving parts or hot surfaces.
- Fix the cable to existing cable runs inside the vehicle using cable ties, but make sure they are away from any moving or hot surfaces.
- When the cabling must go through a panel, use a suitable gland.
- When fixing the conduit or cable on the outside of a vehicle, use P-Clips. Either drill and tap the hole or use a nut and bolt to secure the clip.
- Ensure the cable does not have tight bends. The minimum recommended radius is 63.5 mm (2.5 in.).
- Ensure cables do not swing or chafe on the structure. This often requires using cable ties approximately every foot, and ensuring the cables do not flex often, especially where they connect to the VC70. However, if you must re-position the VC70 occasionally, ensure there is enough slack in the cable to accommodate movement without putting tension on the cable.
- DO NOT wind a cable in and out of the mesh on a cage.
- 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.
- Ensure that all fuses are as close as possible to the power source.

12 Volt Internal Combustion Engine Forklifts

- ✓ **NOTE** The vehicle computer contains an Ignition Sense feature that detects when the ignition switch is turned off and shuts the vehicle computer down after a preprogrammed timeout. This feature allows the operator to use the vehicle computer for a predetermined time period after the ignition switch is turned off, then shuts the vehicle computer down automatically to prevent over-discharge of the forklift battery. The timeout period is adjustable by the user (see [Ignition Sensing on page 3-22](#) for setting the timeout value). The normal current draw of a suspended vehicle computer is approximately 500mA. When the vehicle computer shuts down using the Ignition Sense feature, current draw is reduced to approximately 5 mA. This feature provides the automatic shutoff functionality of an external relay, without requiring an actual relay and has the added benefit of allowing the user to work for a preset time period before shutting down.

- All power wiring must use the supplied power cable.
- Fuse:
 - one 3AB, 15A, 250V, FST BLO fuse - 9-60V DC
- Keep the path between the battery and the vehicle computer as short as possible, and away from any part of the ignition high tension system.

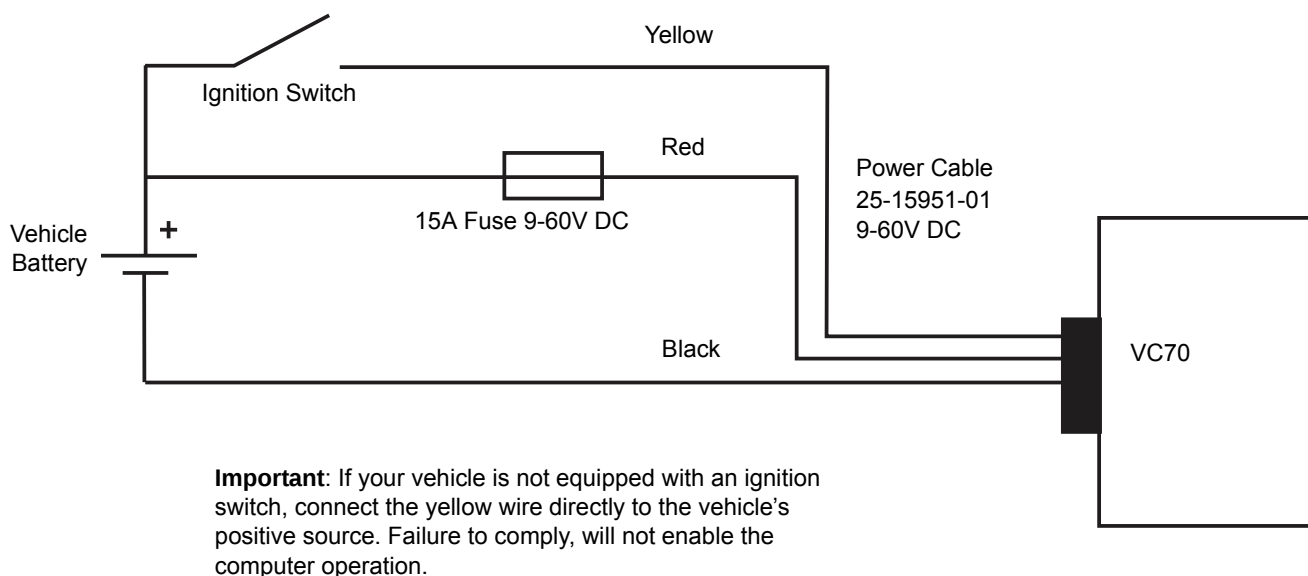


Figure 2-11 Wiring Diagram

You can use your old VC5090 power cable. When employing this option, use VC5090 Bridge Cable, PN 25-15953-01. You must also replace the fuses on the red and black wires of the old cable with the new fuses supplied with the bridge cable kit.

- ✓ **NOTE** See the vehicle Owner's Manual for specific wiring information.

1. Disconnect the vehicle battery.
2. Connect the red wire to the vehicle's positive power source. Connect the black wire to the vehicle's negative power source.
3. Connect the green wire to the vehicle's ignition switch. If you do not plan on using the Ignition Sense feature, connect the green wire to the vehicle's positive power source.

4. Ensure the wiring connections created are sufficiently insulated from each other.
5. Re-connect the vehicle battery.
6. Connect the power cable connector into the vehicle computer's Power port. Align the keyway on the power connector with the notch on the vehicle computer's power port.

Electric Forklifts

✓ **NOTE** See the vehicle Owner's Manual for specific wiring information.

1. Disconnect the vehicle battery.
2. Connect the green wire to the vehicle's negative power source.
3. Shorten cable to desired length.
4. Connect the red wire to the vehicle's positive power source. Connect the black wire to the vehicle's negative power source.
5. Connect the yellow wire to the vehicle's positive power source.
6. Ensure the wiring connections created are sufficiently insulated from each other.
7. Re-connect the vehicle battery.
8. Insert the power cable connector into the vehicle computer's Power port. Align the keyway on the power connector with the notch on the vehicle computer's power port.

Installing the VC70 on a Cart, a Wall, or a Desktop

To mount the vehicle computer on a cart, a wall, or a desktop:

- Install the U-mount to the desktop.
- Connect the vehicle computer to the AC power supply.

Mounting the Bracket on a Desktop



CAUTION If mounting to a thin surface such as drywall or plywood, a reinforcing plate is required.



NOTE The VC70 ships with four No. 8 Allen head screws (M10x50mm) for securing the mounting bracket. If the supplied cap screws are not long enough, use M10 - X stainless steel Allen head screws where X represents the length in millimeters of the required screws.

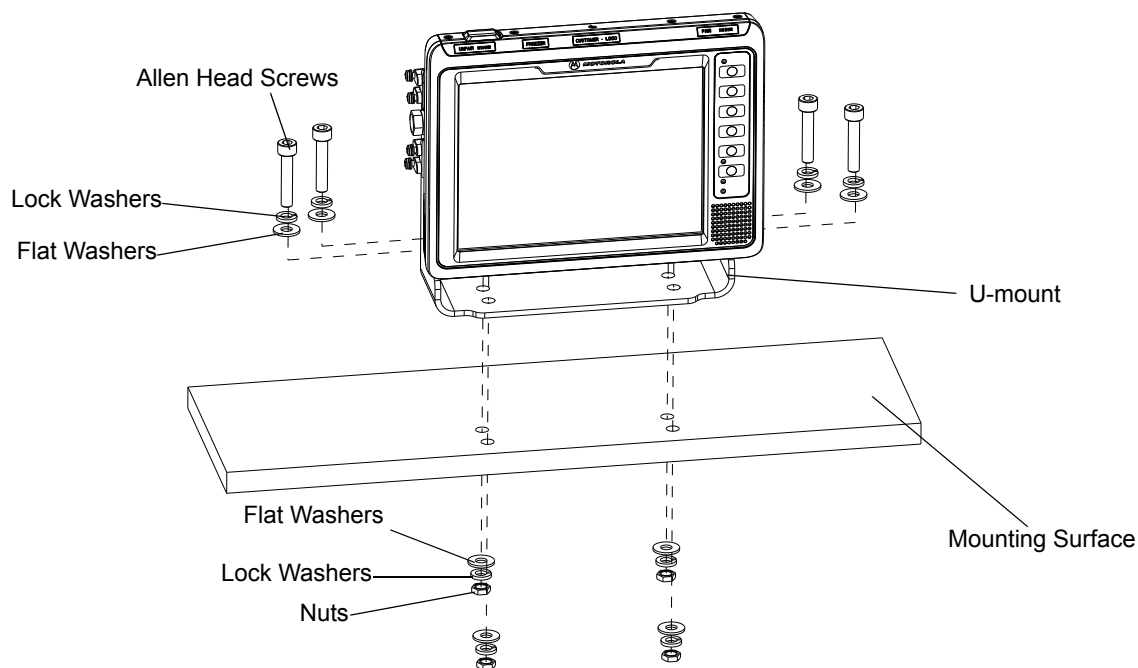


Figure 2-12 Mounting on a Desktop

Connecting the Vehicle Computer to AC Power

- ✓ **NOTE** Use only a Motorola-approved power supply, output rated 12 VDC and minimum 9A (part number 50-14000--241R). The power supply is certified to EN60950 with SELV outputs.

To provide power from an AC source:

1. Insert the AC line cord into the AC connector on the universal power supply.

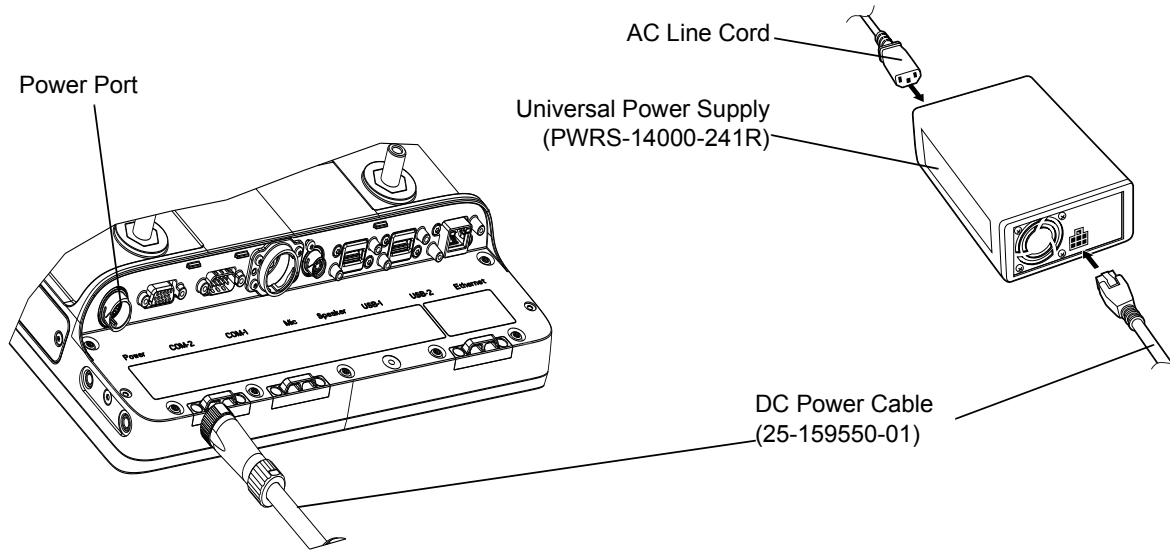


Figure 2-13 Connecting AC power

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 vehicle computer's Power port.

Installing the DC Power Supply (PSU) on the VC70

✓ **NOTE** Follow this procedure when using the U-mount. The PSU fastening screws are supplied with the U-mount kit.

1. Attach the PSU to the back of the vehicle computer.
2. Screw the four M5x14mm screws into the PSU mounting holes and tighten. Torque the screws $20 \pm 10\%$ kgf-cm ($17 \pm 10\%$ lbs-in).

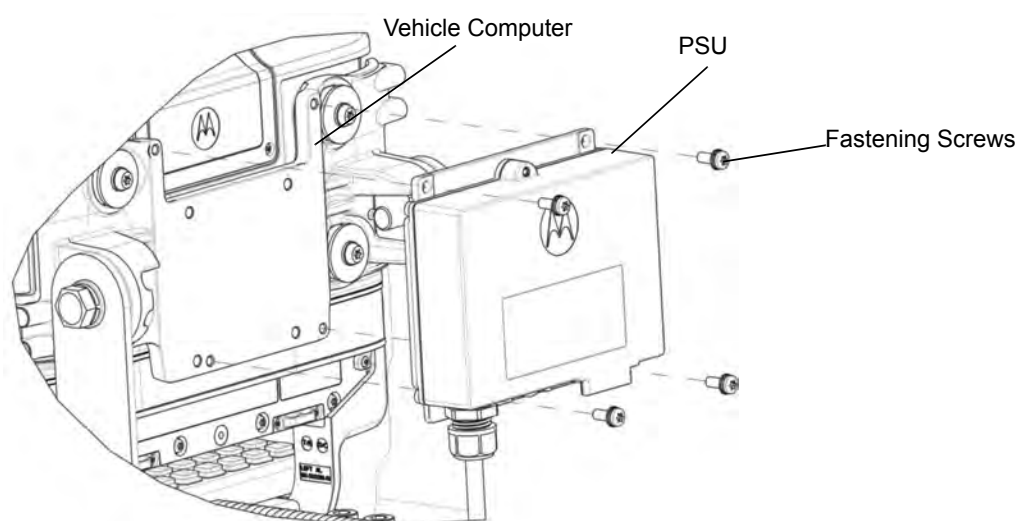


Figure 2-14 Installing the PSU

✓ **NOTE** When using another type of a mount to install the VC70, the PSU may have to be installed remotely. Use the template shown below to prepare the installation surface. You need to also use an extender cable PN 25-159549-01 to connect the PSU to the vehicle computer.

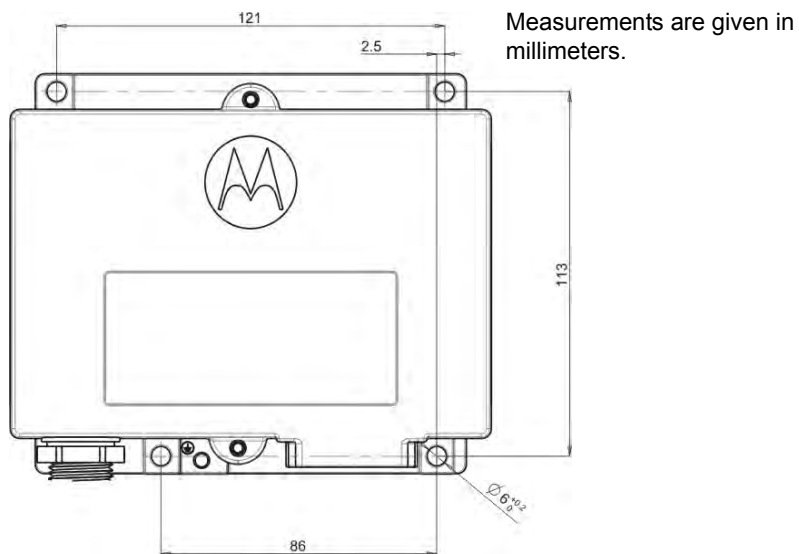


Figure 2-15 PSU Installation Template

Installing the Optional QWERTY/AZERTY Keyboard

The keyboard kit contains the following items:

- Keyboard
- Right and left mounting arms
- Four torx head screws with flat and lock washers
- Six screws with captive flat and lock washers (for keyboard fastening)
- Two locking knobs, two flat washers and two lock washers.

1. Position the keyboard on the tray and fasten six M4x10mm screws.

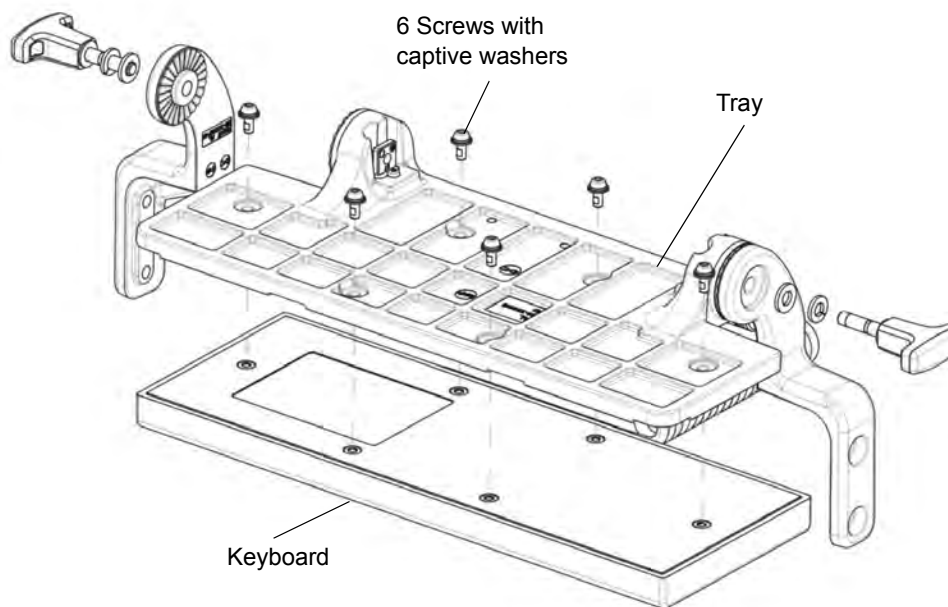


Figure 2-16 *Attaching the Keyboard to the Tray*

2. Attach the left and right mounting arms to both sides of the VC70, using the M5x14mm torx head screws with flat and lock washers. Only tighten the cap screws three turns.

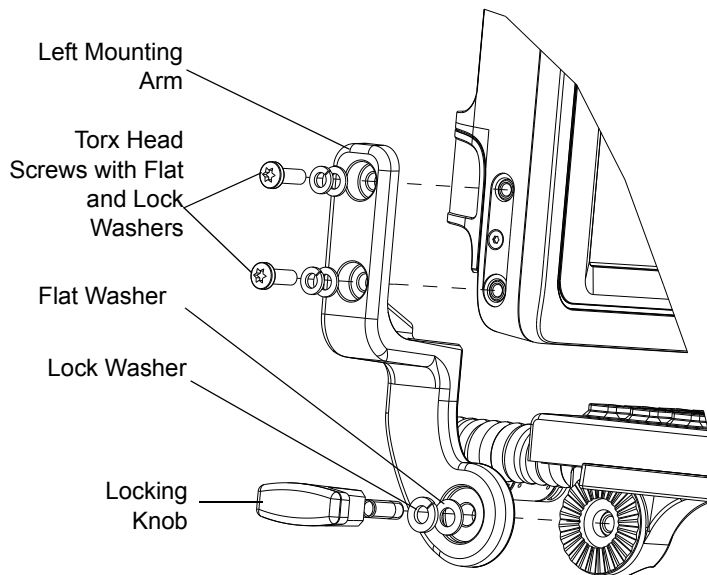


Figure 2-17 *Attaching the Brackets to the VC70*

3. Insert the keyboard locking knobs through the washers and brackets and screw into the keyboard tray. Tighten fully to lock into place.
4. Torque the mounting arms torx head screws to 40 + 10% kgf-cm (35 + 10% lbs-in).
5. To adjust keyboard tray position, loosen the right and left locking knobs two full turns and rotate the keyboard tray to the desired position. The keyboard tray snaps into possible positions as it is rotated.

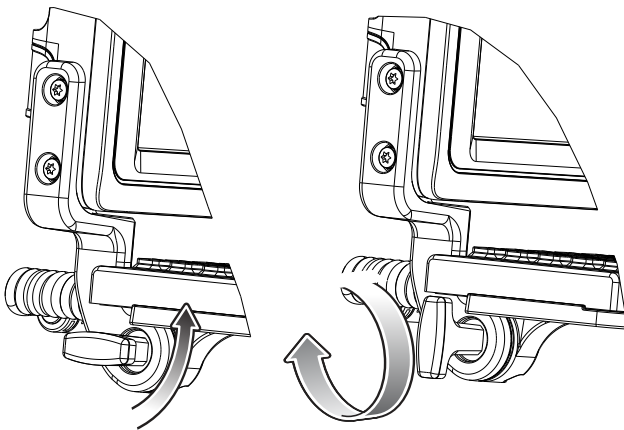


Figure 2-18 *Adjusting the Keyboard Tray Position*

6. Tighten the keyboard tray locking knobs to secure the tray in position.
7. Plug the keyboard cable into one of the USB connectors and carefully screw the locking screws using a flat head screw driver.

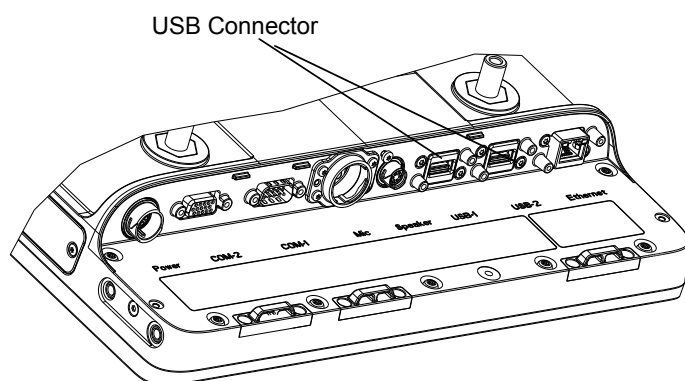


Figure 2-19 *USB Connectors*

Installing the Optional VC5090 Keyboard on the VC70

You can install the VC5090 keyboard on the VC70 using the keyboard adapter kit (PN KT-VC50KYBD-ADPT-R).

The kit contains the following items:

- Two spacers with screws and washers
 - Adapter cable.
1. Attach the keyboard spacers to both sides of the VC70 using 2 M5x14mm torx head screws with captive washers for each spacer. Torq the screws to 20 + 5% kgf-cm (17 + 5% lbs-in).

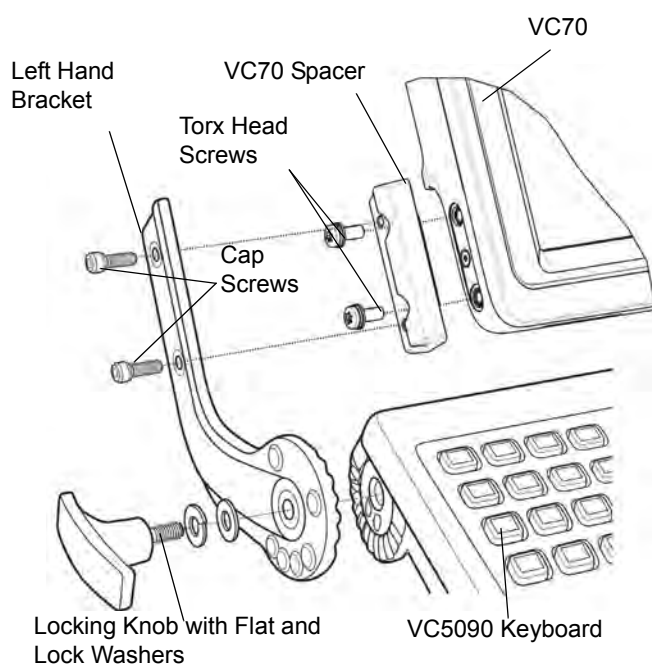


Figure 2-20 *Installing the VC5090 Keyboard on the VC70*

2. Attach the VC5090 keyboard brackets (part of the VC5090 keyboard assembly) to both sides of the VC70, using the cap screws with captive washers. Only tighten the cap screws three turns.
3. Insert the keyboard locking knobs through the washers and brackets and screw into the keyboard. Tighten fully to lock into place.
4. Torque the bracket cap screws to 230 kgf-cm (200 lbs-in).
5. Connect the VC5090 keyboard cable to the supplied adapter cable.

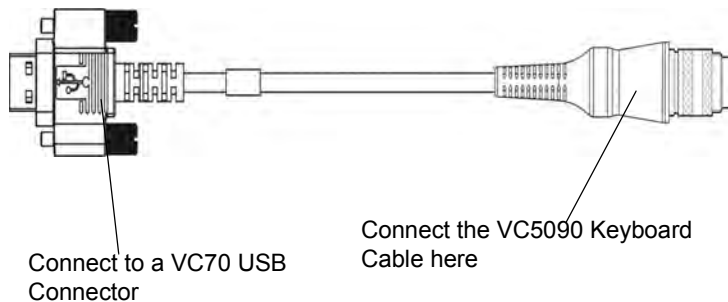


Figure 2-21 VC5090 Adapter Cable

6. Connect the USB connector of the adapter cable into one of the VC70 USB connectors and carefully screw the locking screws using a flat head screw driver.

Installing a Numeric Keyboard

The Numeric keyboard is installed using the following items:

- numeric keyboard mount with all required screws for attaching the keyboard to the mount and the mount to the vehicle computer
1. Attach the numeric keyboard to the mount, using six M4x10mm torx head screws with captive washers.
 2. Torque the numeric keyboard torx head screws to 8 + 10% kgf-cm (7 + 10% lbs-in).

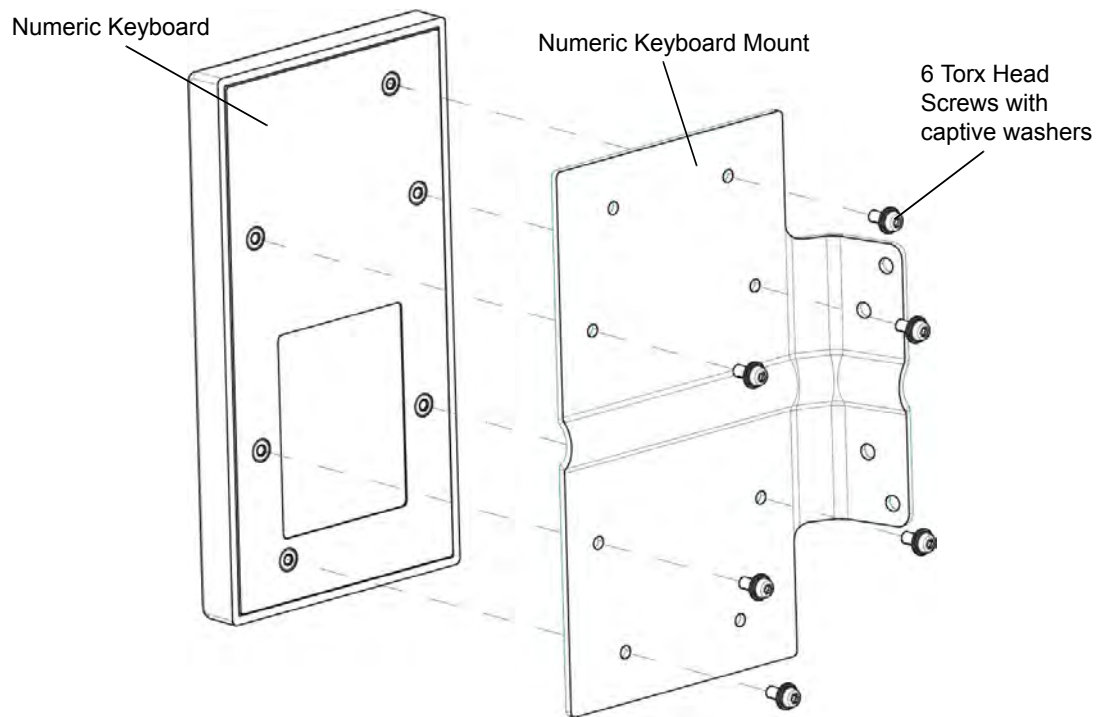


Figure 2-22 *Installing the Numeric Keyboard on the Mount*

3. Attach the numeric keyboard mount to the VC70, using four M5x14mm torx head screws with captive washers. Tighten the screws.
4. Torque the numeric keyboard torx head screws to $20 + 10\%$ kgf-cm ($17 + 10\%$ lbs-in).

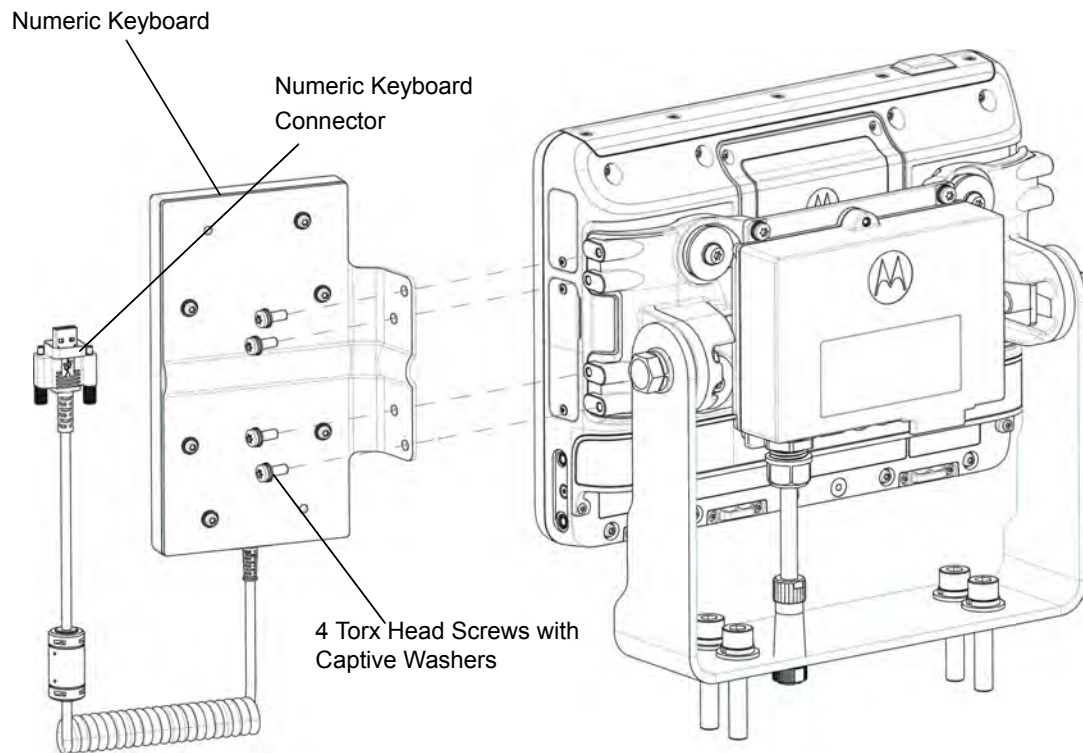


Figure 2-23 *Installing the Mount on the VC70*

5. Connect the numeric keyboard to a free USB connector. Fasten the screws using a flat head screw driver.

Installing the Scanner Mount

The Scanner mount kit contains the following items:

- side accessory mount (PN KT-ACCMNT-VC70-R) with two screws, two captive lock washers and flat washers
 - scanner mount (PN KT-SCANMNT-VC70-R) with four screws, four captive lock washers and flat washers
1. Attach the scanner mount to the side accessory mount, using four M4x10mm screws with captive flat and lock washers. Torque the screws to $8 + 10\%$ kgf-cm ($7 + 10\%$ lbs-in).
 2. Attach the side accessory mount to the VC70, using two M5x14mm screws with captive flat and lock washers. Torque the screws to $20 + 10\%$ kgf-cm ($17 + 10\%$ lbs-in).

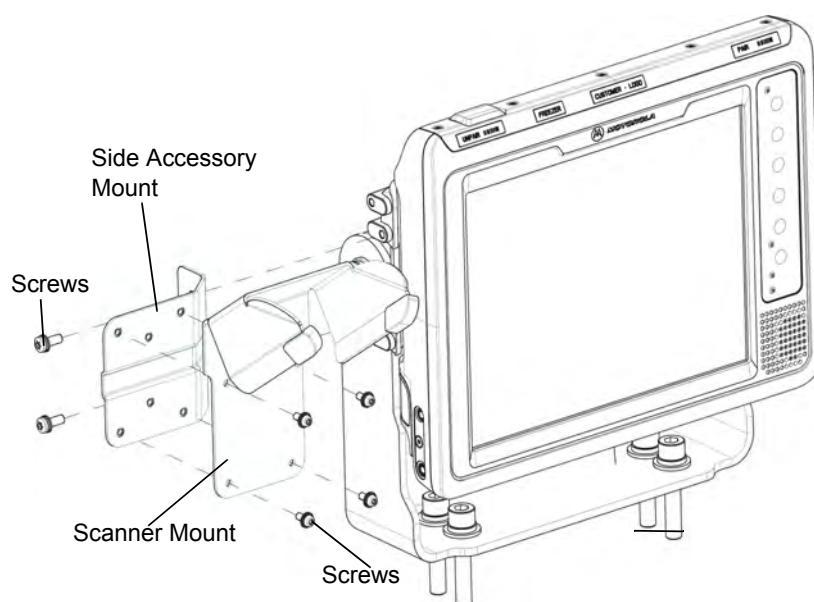


Figure 2-24 *Installing the Scanner Bracket*

Installing a Scanner

The following scanners can be connected to the vehicle computer:

- LS3408-ER Rugged barcode laser scanner (serial/USB)
- DS3508-ER Rugged 1D/2D imager scanner (serial/USB)
- DS3578-ER Rugged cordless 1D/2D imager scanner (bluetooth)
- LS3578-ER Rugged barcode scanner (bluetooth)
- DS457 Fixed mount imager scanner (serial/USB)
- RS507 Hands free cordless imager (bluetooth)

Connecting a Serial SSI Scanner (LS3408-ER/DS3508-ER) to a Serial Port

✓ **NOTE** Refer to the scanner Product Reference Guide for information on configuring the scanner.

To connect a serial scanner to the VC70:

1. Connect the serial scanner cable to the scanner.
2. Connect the serial scanner cable to the COM1 port.

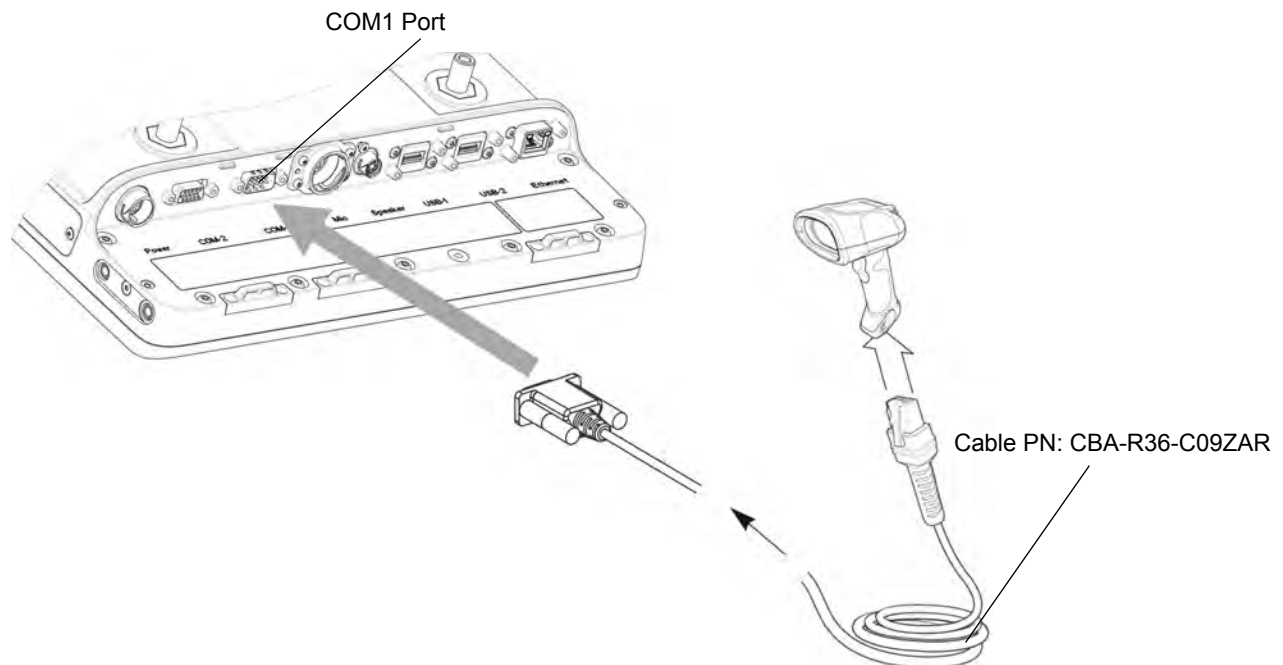


Figure 2-25 Connecting Serial Scanner to COM1 Connector

3. Launch the "System Manager" in the Control Panel.
4. In the "External Devices" tab, check the "External Scanner Power (COM1)" check box.

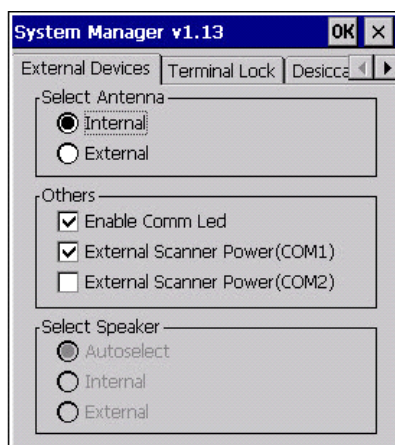


Figure 2-26 System Manager Window

5. Scan the **Set All Defaults** bar code.



Figure 2-27 Set All Defaults Bar Code

✓ **NOTE** The above allows the scanner to reset from any previous configuration to the default configuration.

6. Scan a SSI HOST barcode.



Figure 2-28 SSI Host Bar Code

✓ **NOTE** To select SSI as the host interface, scan the above bar code. This is a scan API mode SSI.

7. Scan Send Packeted Decode Data barcode.



Figure 2-29 Send Packeted Decode Data Bar Code

8. Scan Write to Custom Defaults barcode.



Write to Custom Defaults

Figure 2-30 Custom Default Bar Code

9. Verify that the scanner is connected properly. See [Verifying the Scanner is Working Properly on page 2-42](#).

Connecting a Serial Scanner (LS3408-ER/DS3508-ER) to a Serial Port

✓ **NOTE** Refer to the scanner Product Reference Guide for information on configuring the scanner.

To connect a serial scanner to the VC70:

1. Connect the serial scanner cable to the scanner.
2. Connect the serial scanner cable to the COM1 port.

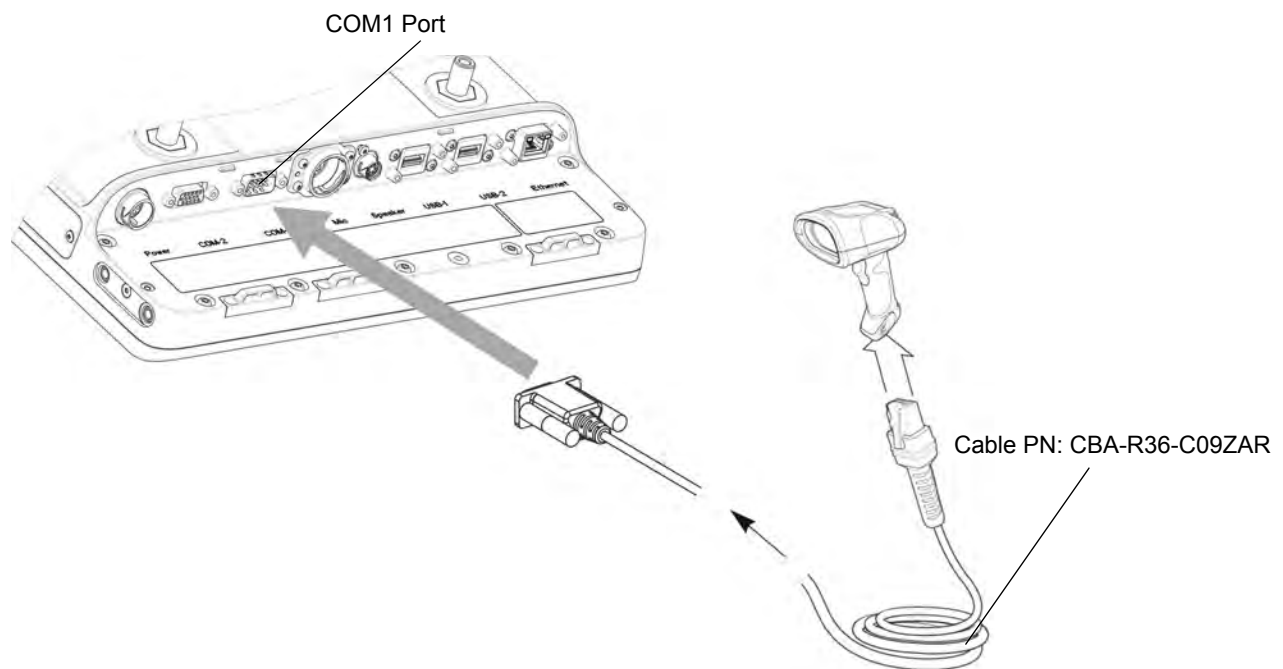


Figure 2-31 Connecting Serial Scanner to COM1 Connector

3. Launch the "System Manager" in the Control Panel.
4. In the "External Devices" tab, check the "External Scanner Power (COM1)" check box.

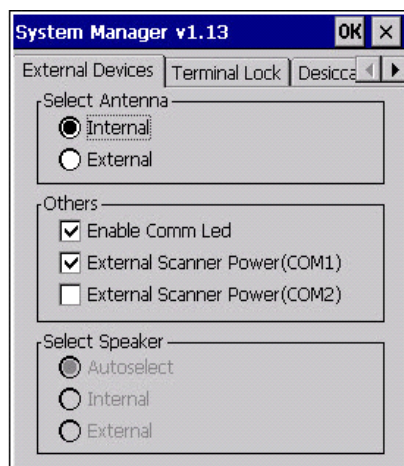


Figure 2-32 System Manager Window

5. Scan the **Set All Defaults** bar code.



Figure 2-33 Set All Defaults Bar Code

✓ **NOTE** The above allows the scanner to reset from any previous configuration to the default configuration.

6. Scan a serial configuration barcode.



Figure 2-34 Serial Configuration Bar Code

7. Scan the Host: RTS High barcode.



Figure 2-35 Host: RTS High Bar Code

✓ **NOTE** RTS must be configured High to enable reading.

8. Scan the send row decode data barcode.



Figure 2-36 Send Row Decode Data Barcode

9. Scan Write to Custom Defaults barcode.



Write to Custom Defaults

Figure 2-37 Custom Default Bar Code

10. Verify that the scanner is connected properly. See [Verifying the Scanner is Working Properly on page 2-42](#).

Connecting a Serial SSI Scanner (DS457) to a Serial Port

✓ **NOTE** Refer to the scanner Product Reference Guide for information on configuring the scanner.

To connect a serial RS 457 scanner to the VC70:

1. Connect the serial scanner cable to the scanner.
2. Connect the serial scanner cable to the COM1 port.

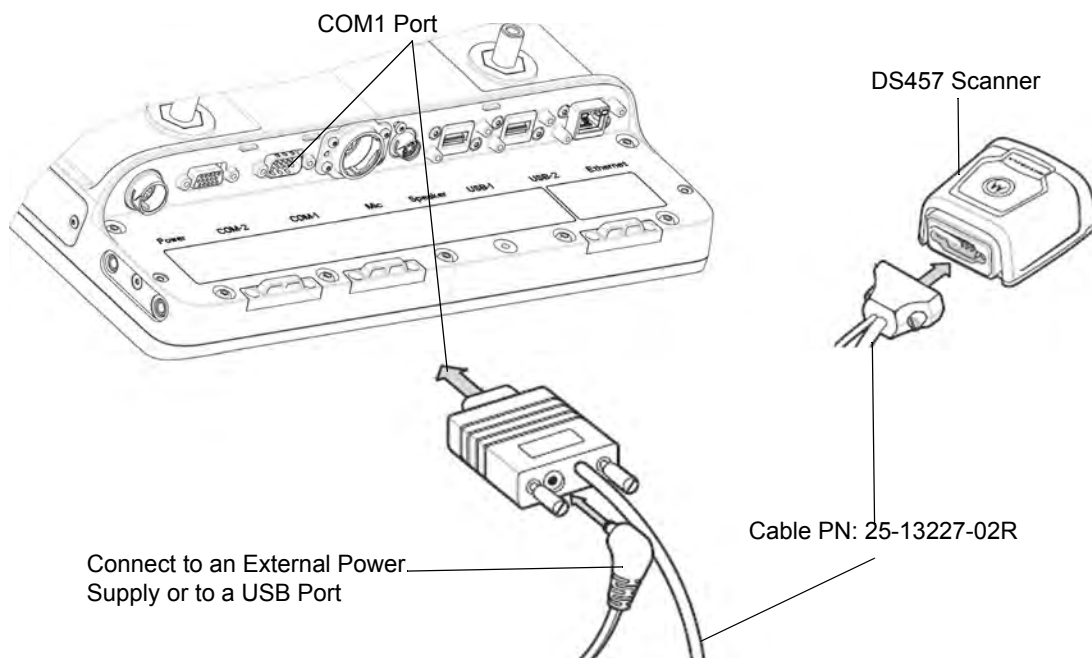


Figure 2-38 Connecting Serial Scanner (DS457) to COM1 Connector

3. Connect the serial connector power inlet to an external power supply or to a USB port.
4. Scan the **Set All Defaults** bar code.



Figure 2-39 *Set All Defaults Bar Code*

✓ **NOTE** The above allows the scanner to reset from any previous configuration to the default configuration.

5. Scan a SSI HOST barcode.



Figure 2-40 *SSI Host Bar Code*

✓ **NOTE** To select SSI as the host interface, scan the above bar code. This is a scan API mode SSI.

6. Scan Send Packeted Decode Data barcode.



Figure 2-41 *Send Packeted Decode Data Bar Code*

7. Scan Write to Custom Defaults barcode.



Write to Custom Defaults

Figure 2-42 *Custom Default Bar Code*

8. Verify that the scanner is connected properly. See [Verifying the Scanner is Working Properly on page 2-42](#).

Connecting a Serial Scanner (RS457) to a Serial Port

✓ **NOTE** Refer to the scanner Product Reference Guide for information on configuring the scanner.

To connect a serial scanner to the VC70:

1. Connect the serial scanner cable to the scanner.
2. Connect the serial scanner cable to the COM1 port.

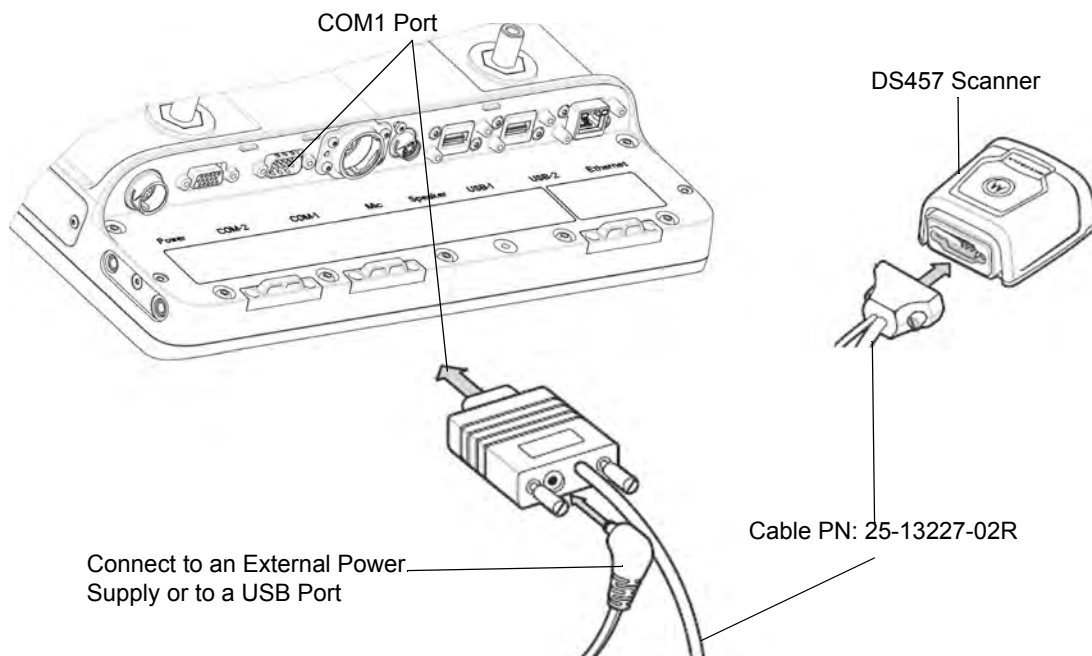


Figure 2-43 Connecting Serial Scanner (DS457) to COM1 Connector

3. Connect the serial connector power inlet to an external power supply or to a USB port.
4. Scan the **Set All Defaults** bar code.



Figure 2-44 Set All Defaults Bar Code

✓ **NOTE** The above allows the scanner to reset from any previous configuration to the default configuration.

5. Scan a serial configuration barcode.



Figure 2-45 Serial Configuration Bar Code

6. Scan the Host: RTS High barcode.



Figure 2-46 Host: RTS High Bar Code

✓ **NOTE** RTS must be configured High to enable reading.

7. Scan the send row decode data barcode.



Figure 2-47 Send Row Decode Data Barcode

8. Scan Write to Custom Defaults barcode.



Write to Custom Defaults

Figure 2-48 Custom Default Bar Code

9. Verify that the scanner is connected properly. See [Verifying the Scanner is Working Properly on page 2-42](#).

Connecting a DS3578-ER/LS3578-ER Scanner Cradle to a Serial Port

To connect a DS3578-ER/LS3578-ER Scanner Cradle to the VC70:

1. Connect the serial scanner cable to the cradle (use cable P/N CBA-R36-C09ZAR).
2. Connect the serial scanner cable to the COM1 port.

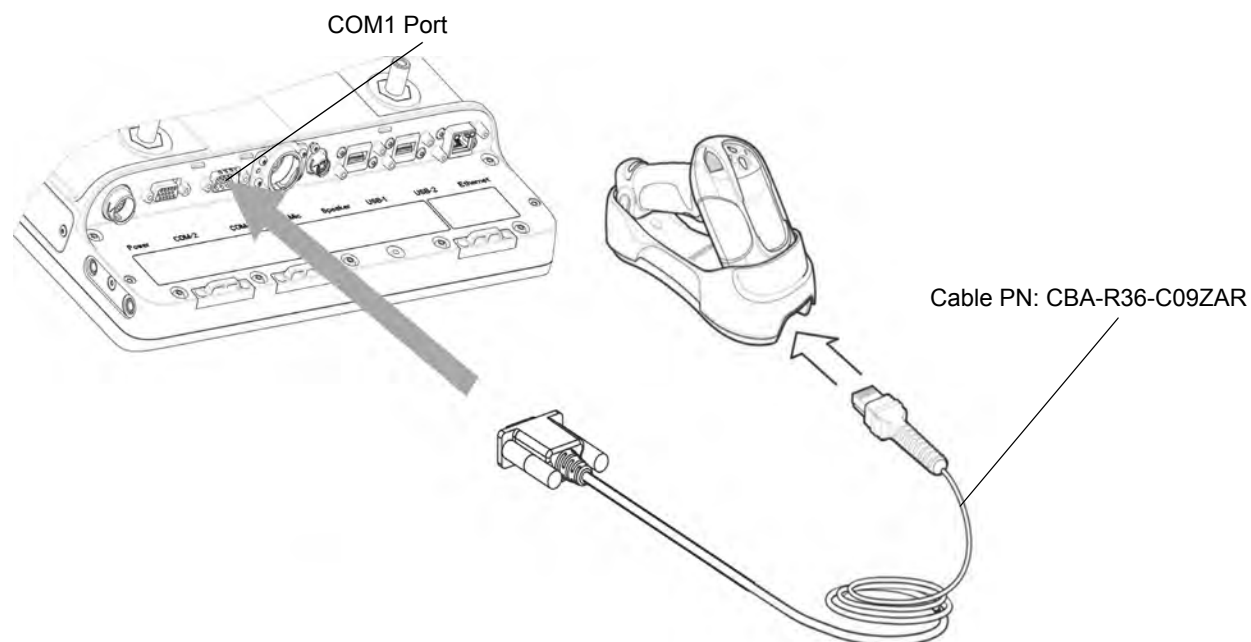


Figure 2-49 Connecting Serial Scanner Cradle to COM1 Connector

3. Scan the **Set All Defaults** barcode.



Figure 2-50 *Set All Defaults Bar Code*



NOTE The above allows the scanner to reset from any previous configuration to the default configuration.

4. Scan a Cradle Host barcode to configure the scanner to Bluetooth SCAN API mode before the pairing.



***Cradle Host**

Figure 2-51 *Cradle Host Bar Code*

5. Scan the PAIR label barcode on the cradle.
6. Scan a serial configuration barcode.



Figure 2-52 *Serial Configuration Bar Code*

7. Scan the Host: RTS High barcode.



Figure 2-53 *Host: RTS High Bar Code*



NOTE RTS must be configured High to enable reading.

8. Scan the send row decode data barcode.



Figure 2-54 *Send Row Decode Data Barcode*

9. Scan Write to Custom Defaults barcode.



Write to Custom Defaults

Figure 2-55 Custom Default Bar Code

10. Verify that the scanner is connected properly. See [Verifying the Scanner is Working Properly on page 2-42](#).
11. To unpair the scanner from the cradle, scan the Unpairing barcode.

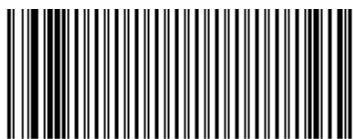


Figure 2-56 Unpairing Bar Code

Connecting a DS3578-ER/LS3578-ER Scanner to a USB Port

To connect a DS3578-ER/LS3578-ER scanner to the VC70:

✓ **NOTE** Refer to the scanner Product Reference Guide for information on configuring the scanner.

1. Connect the USB scanner cable (PN 25-159548-01) to the scanner.
2. Connect the USB scanner cable to the USB connector. You may connect your cable to USB 1 or USB 2.

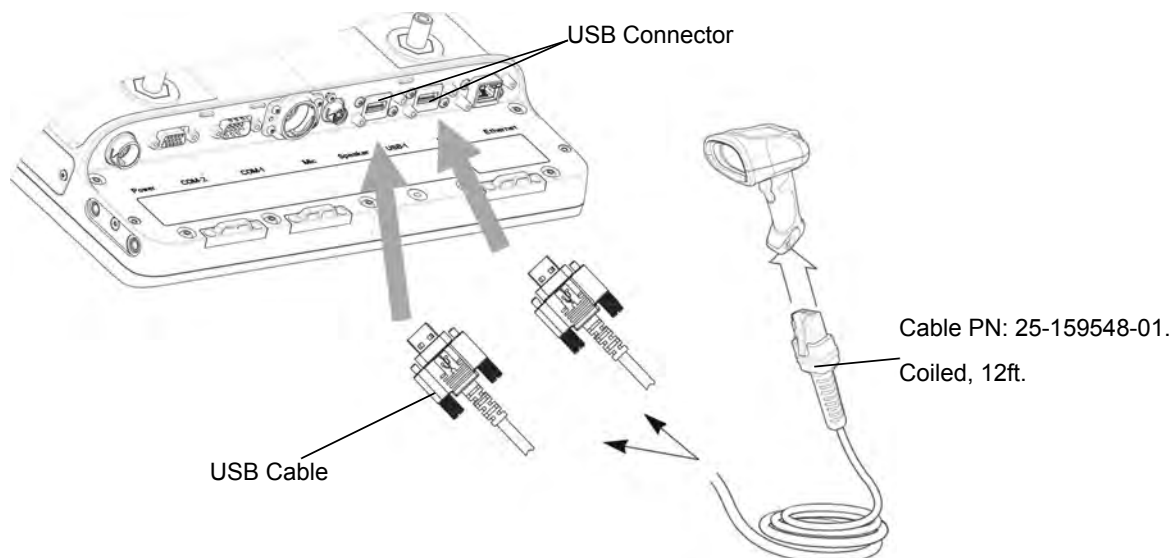


Figure 2-57 Connecting a Scanner to a USB Port

3. Open Microsoft WordPad and scan the following barcode. Verify a correct reading.

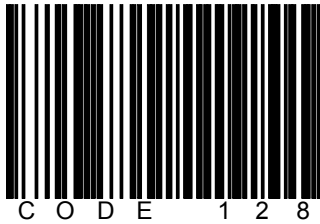


Figure 2-58 Code 128 Bar Code

Connecting a DS457 Scanner to a USB Port

To connect a DS457 scanner to the VC70:

✓ **NOTE** Refer to the scanner Product Reference Guide for information on configuring the scanner.

1. Connect the USB scanner cable (PN 25-58926-01R) to the scanner.
2. Connect the USB scanner cable to the USB connector. You may connect your cable to USB 1 or USB 2.

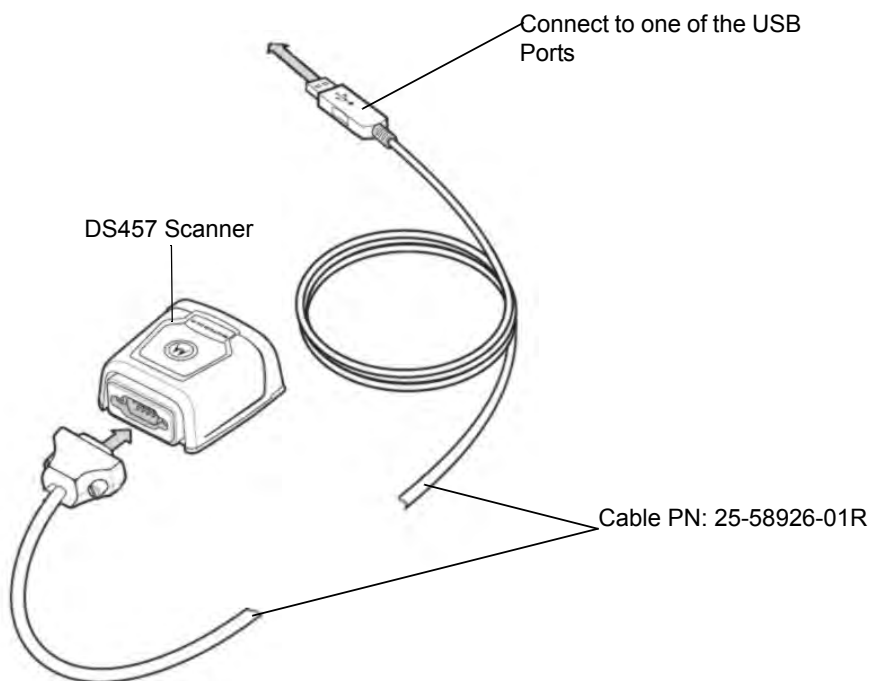


Figure 2-59 Connecting a DS457 Scanner to a USB Port

3. Open Microsoft WordPad and scan the following barcode. Verify a correct reading.



Figure 2-60 Code 128 Bar Code

Connecting a DS3578-ER/LS3578-ER Scanner Cradle to a USB Port

To connect a DS3578-ER/LS3578-ER Scanner Cradle to the VC70:

1. Connect the USB scanner cable (PN 25-159548-01) to the cradle.
2. Connect the USB scanner cable to the one of the VC70 USB ports.

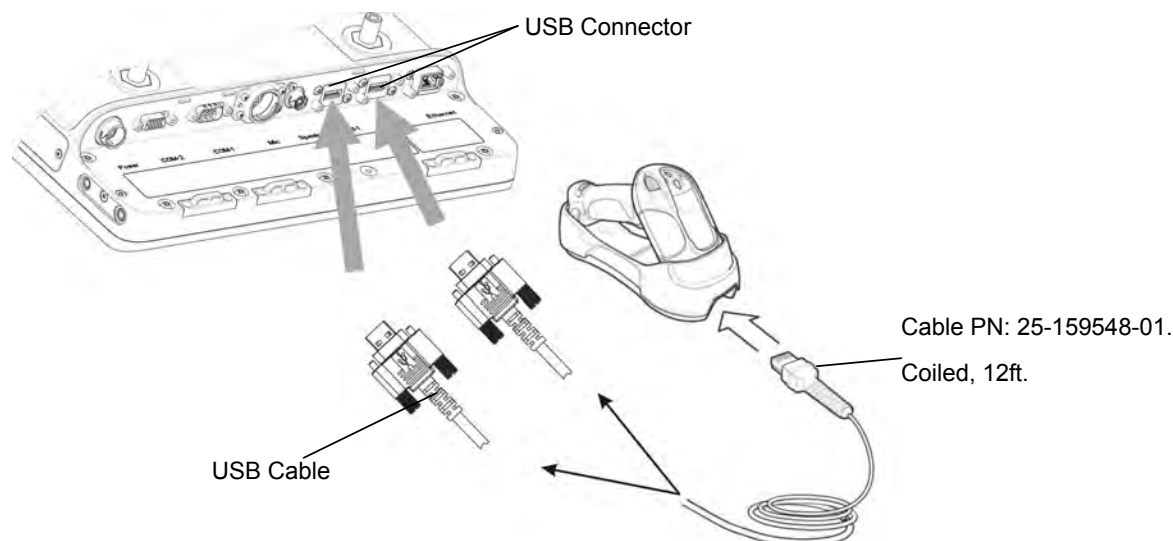


Figure 2-61 Connecting a USB Scanner Cradle

3. Scan the **Set All Defaults** barcode.



Figure 2-62 Set All Defaults Bar Code



NOTE The above allows the scanner to reset from any previous configuration to the default configuration.

4. Scan a Cradle Host barcode to configure the scanner to Bluetooth SCAN API mode before the pairing.



***Cradle Host**

Figure 2-63 *Cradle Host Bar Code*

5. Scan Write to Custom Defaults barcode.



Write to Custom Defaults

Figure 2-64 *Custom Default Bar Code*

6. Scan the PAIR label barcode on the cradle.
7. Verify that the scanner is connected properly. See [Verifying the Scanner is Working Properly on page 2-42](#).
8. To unpair the scanner from the cradle, scan the Unpairing barcode.



Figure 2-65 *Unpairing Bar Code*

Connecting a Bluetooth Scanner (DS3578) Directly to the VC70 (Scan Profile)

✓ **NOTE** Refer to the scanner Product Reference Guide for information on configuring the scanner.

To connect a Bluetooth scanner to the VC70:

1. Ensure that the scanner battery is fully charged.
2. Scan the **Set All Defaults** bar code.



Figure 2-66 *Set All Defaults Bar Code*

✓ **NOTE** The above allows the scanner to reset from any previous configuration to the default configuration.

3. Scan a Cradle Host barcode to configure the scanner to Bluetooth SCAN API mode before the pairing.



***Cradle Host**

Figure 2-67 *Cradle Host Bar Code*

4. Scan Write to Custom Defaults barcode.



Write to Custom Defaults

Figure 2-68 *Custom Default Bar Code*

5. To pair the scanner with your VC70, scan the pair label barcode in the upper right side of the VC70. The scanner beeps indicating that it is successfully connected to the VC70.
6. Verify that the scanner is connected properly. See [Verifying the Scanner is Working Properly on page 2-42](#).
7. When completing scanning, scan the unpair label barcode in the upper left side of the VC70. This will disconnect your scanner from the VC70.

Connecting a Bluetooth Scanner (RS507) Directly to the VC70 (Scan Profile)

✓ **NOTE** Refer to the scanner Product Reference Guide for information on configuring the scanner.

To connect a Bluetooth scanner to the VC70:

1. Ensure that the scanner battery is fully charged.
2. Scan a Scan Profile barcode to configure the scanner to Bluetooth SCAN API mode before the pairing.



Figure 2-69 *Scan Profile Bar Code*

✓ **NOTE** Perform a cold boot by removing and re-installing the battery onto the RS507.

3. To pair the scanner with your VC70, scan the pair label barcode in the upper right side of the VC70. The scanner beeps indicating that it is successfully connected to the VC70.
4. Verify that the scanner is connected properly. See [Verifying the Scanner is Working Properly on page 2-42](#).
5. When completing scanning, scan the unpair label barcode in the upper left side of the VC70. This will disconnect your scanner from the VC70.

Connecting a Bluetooth Scanner (RS507) Directly to the VC70 (SPP Profile)

✓ **NOTE** Refer to the scanner Product Reference Guide for information on configuring the scanner.

To connect a Bluetooth scanner to the VC70:

1. Ensure that the scanner battery is fully charged.
2. Scan a SPP Profile barcode to configure the scanner to Bluetooth SPP profile mode before the pairing.



Figure 2-70 SPP Profile Bar Code

✓ **NOTE** Perform a cold boot by removing and re-installing the battery onto the RS507.

3. To pair the scanner with your VC70, scan the pair label barcode in the upper right side of the VC70. The scanner beeps indicating that it is successfully connected to the VC70.
4. Verify that the scanner is connected properly. See [Verifying the Scanner is Working Properly on page 2-42](#).
5. When completing scanning, scan the unpair label barcode in the upper left side of the VC70. This will disconnect your scanner from the VC70.

Connecting a Bluetooth Scanner (DS3578/LS3578) Directly to the VC70 (SPP Profile)

✓ **NOTE** Refer to the scanner Product Reference Guide for information on configuring the scanner.

To connect a Bluetooth scanner to the VC70:

1. Ensure that the scanner battery is fully charged.
2. Scan the **Set All Defaults** bar code.



Figure 2-71 Set All Defaults Bar Code

✓ **NOTE** The above allows the scanner to reset from any previous configuration to the default configuration.

3. Scan a SPP Profile barcode to configure the scanner to Bluetooth SPP profile mode before the pairing.



Figure 2-72 SPP Profile Bar Code

4. Scan Write to Custom Defaults barcode.



Write to Custom Defaults

Figure 2-73 Custom Default Bar Code

5. To pair the scanner with your VC70, scan the pair label barcode in the upper right side of the VC70. The scanner beeps indicating that it is successfully connected to the VC70.
6. Verify that the scanner is connected properly. See [Verifying the Scanner is Working Properly on page 2-42](#).
7. When completing scanning, scan the unpair label barcode in the upper left side of the VC70. This will disconnect your scanner from the VC70.

Setting up a Scanner Using Data Wedge

- ✓ **NOTE** Data Wedge does not support scanners connected via a USB port.

To configure the VC70 to communicate with the scanner:

1. Double-tap the **DataWedge** icon  on the control panel to launch the application.
2. Select **Advanced Configuration > Profiles > Profile0 > Routs > Rout0 > Input > Plugin >** and select **Serial**.
3. Click **Back** until you return to **Profile0**.
4. Select **Input > Serial > <Required COM port> COM3 > Enable**.

- ✓ **NOTE** The above shown configuration is typical to one type of scanner. Configuration details per scanner type are shown in [Table 2-1 on page 2-41](#).

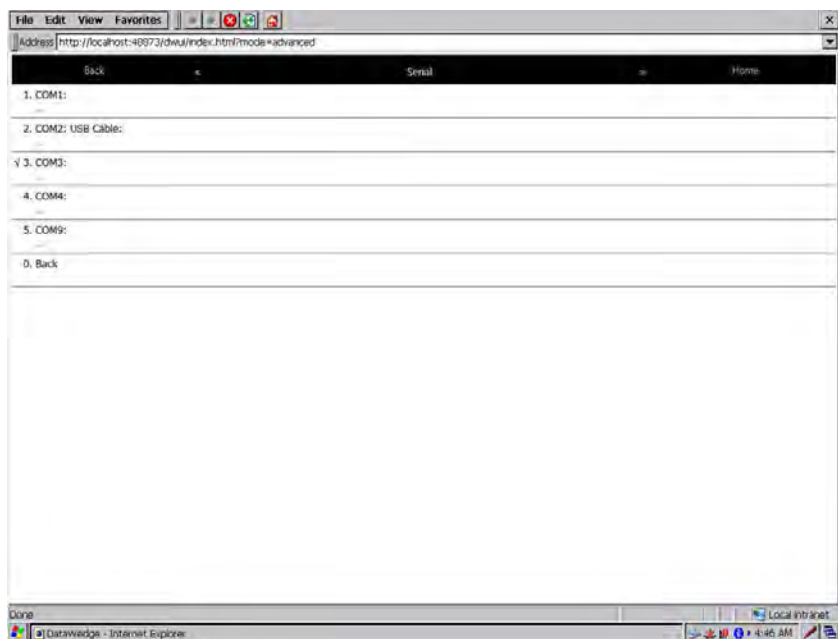


Figure 2-74 Port Selection Window

5. Click **Back** to go back to DataWedge main screen. Verify that your scanner is ready for capture.

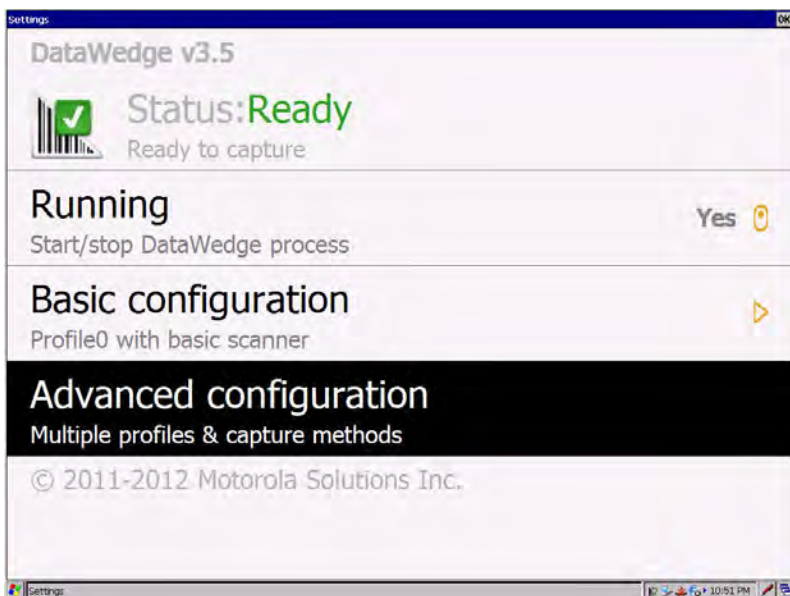


Figure 2-75 Ready to Capture Window

Table 2-1 *Scanners Configuration Using Data Wedge*

Scanner Type	Configuration
LS3408	Profile0/input =Serial/COM3, input plugin=Serial
DS3508	Profile0/input =Serial/COM2: USB cable, input plugin=serial
DS457	- Profile0/input =Serial/COM3, input plugin=serial NOTE Device need to be configured with: Factory Defaults, SSI host, Baud Rate 9600, Host RTS High - Profile0/input =Serial/COM2:USB cable, input plugin=serial
DS3578	- Profile0/input =Serial/COM9, input plugin=serial NOTE Device need to be configured with: Radio Communications Host Type = Serial Port Profile (Master) - Profile0/input =Serial/COM2:USB cable, input plugin=serial NOTE Device need to be configured with Radio Communications Host Type = Cradle Host and paired with cradle
LS3578	- Profile0/input =Serial/COM9, input plugin=serial) NOTE Device need to be configured with: Radio Communications Host Type = Serial Port Profile (Master) - Profile0/input =Serial/COM2:USB cable, input plugin=serial NOTE Device need to be configured with Radio Communications Host Type = Cradle Host and paired with cradle
RS507	Profile0/input =Scanner/BT SSI Scanner, input plugin=scanner

Verifying the Scanner is Working Properly

You can use one of the procedures below to verify that your scanner is working properly.

Using WordPad

1. If using a HID scanner, open WordPad and scan a barcode. Verify your scanning is correct.

Using Scan Sample

1. Tap the  > **Programs** > **Samples** > **Scan** icon.
2. Set your scanner work profile.
3. Scan a barcode and verify your scanning is correct.

Using DataWedge Demo

1. If using **DataWedge**, set up your scanner in accordance with [Setting up a Scanner Using Data Wedge on page 2-39](#).
2. Open the DataWedge Demo. Tap the  > **Windows Explorer** > **Windows** > **DataWedge** > **DWDemo** icon.
3. Aim the scanner at a bar code and press the scan trigger. The bar code data appears in the **DataWedge Demo** window.

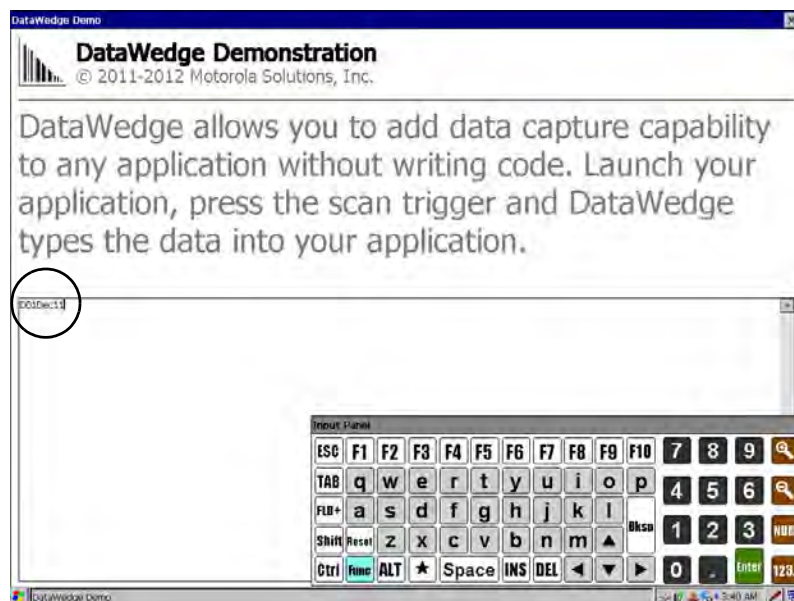


Figure 2-76 DataWedge Demo Window Showing Scanned Barcode

Pairing Bluetooth Scanner and Cradle

The Bluetooth scanner cradle receives power from the vehicle computer. When the vehicle computer goes into suspend mode the vehicle computer removes power to the cradle. When the vehicle computer resumes normal operation, power is re-applied to the cradle. If power to the cradle was removed for more than 30 seconds, the scanner needs to re-connect (pair) to the cradle. Aim the scanner to the cradle pairing barcode. Press the scanner trigger to re-connect the scanner to the cradle. The scanner emits a lo-high beep when re-connecting.

Installing the External Roof-mounted Antenna



WARNING! The antenna must be installed in a location that will ensure a distance of at least 8" (20cm) between the antenna and any bystander.

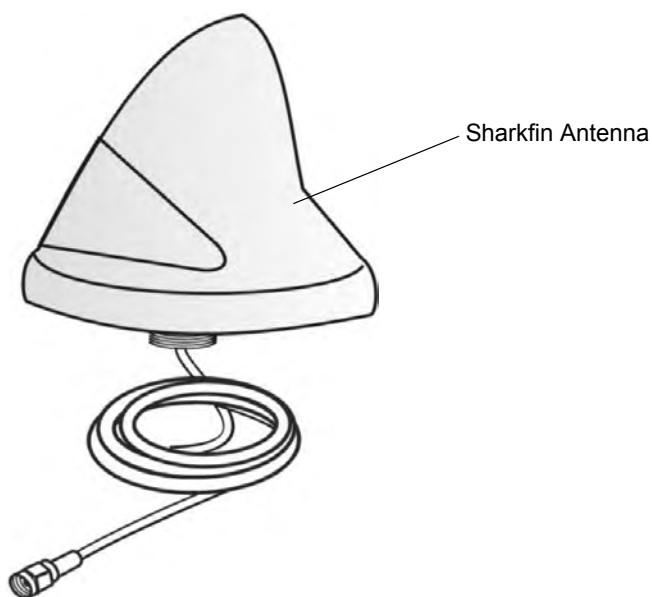


Figure 2-77 Sharkfin Antenna

For general antenna installation instructions refer to the Installation Guide supplied with the antenna.

✓ **IMPORTANT** If not installed on a metal roof, the antenna must be installed in the middle of a flat metal surface (minimum size 2.56" (65 mm)x2.56" (65 mm)).

1. Tap  > **Settings** > **Control Panel** > **System Manager** icon. The **System Management** window displays.

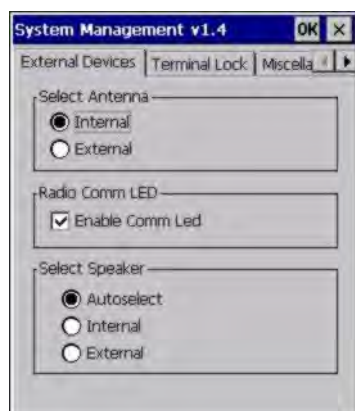


Figure 2-78 RF Settings Tab Window

2. Tap the **External Devices** tab.
3. Tap the **External Antenna** radio button.

4. Tap OK.

Connecting Accessories

Connect an optional scanner, ActiveSync serial cable, or USB device (such as a keyboard or mouse) using the appropriate port on the bottom of the VC70.

You should use either COM1 port for serial ActiveSync or the Micro USB (Micro USB On the Go) port for USB ActiveSync.

A standard USB keyboard or mouse can be connected to the USB A connector (Host).

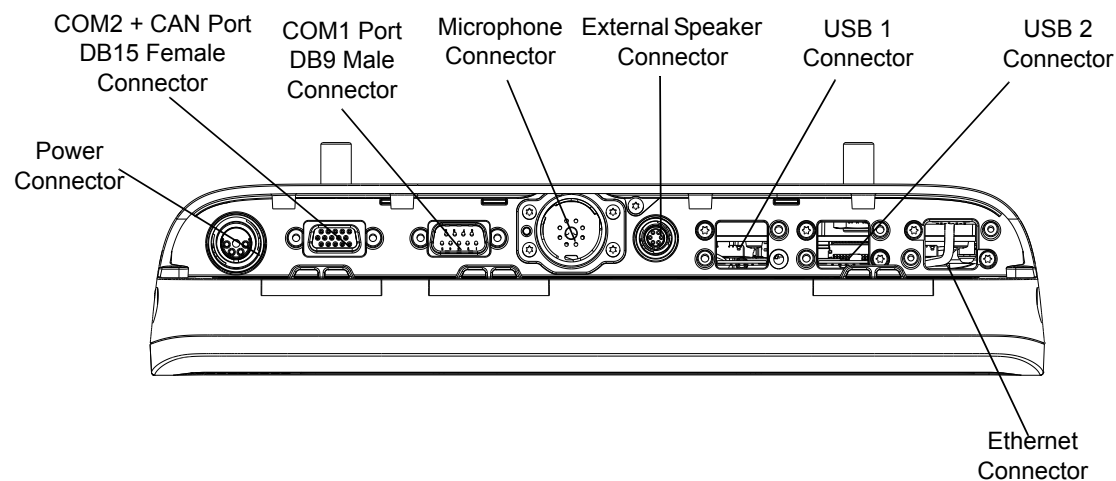


Figure 2-79 Connection Ports

Connecting an External Speaker to the Vehicle Computer

It may be necessary to install an external speaker in noisy environments. Use a Motorola HSN4040 15 Watt water-resistant loudspeaker and connect it to the VC70 External Speaker connector using the adapter cable (PN 25-159552-01).

- ✓ **NOTE** When connecting the adapter cable, the audio is automatically routed to the external speaker. If the external speaker is not connected, you will not be able to hear any audio.

Installing an External Microphone Mount

The External Microphone mount consists of the following two kits:

- microphone holder with two screws and captive washers
 - side mount with two screws and captive washers
1. Attach the microphone holder to the side mount, using two M4x12mm screws with captive washers. Torque the screws to 8 + 10% kgf-cm (7 + 10% lbs-in).

2. Attach the side mount to the VC70, using two M5x14mm screws with captive washers. Torque the screws to 20 + 10% kgf-cm (17 + 10% lbs-in).

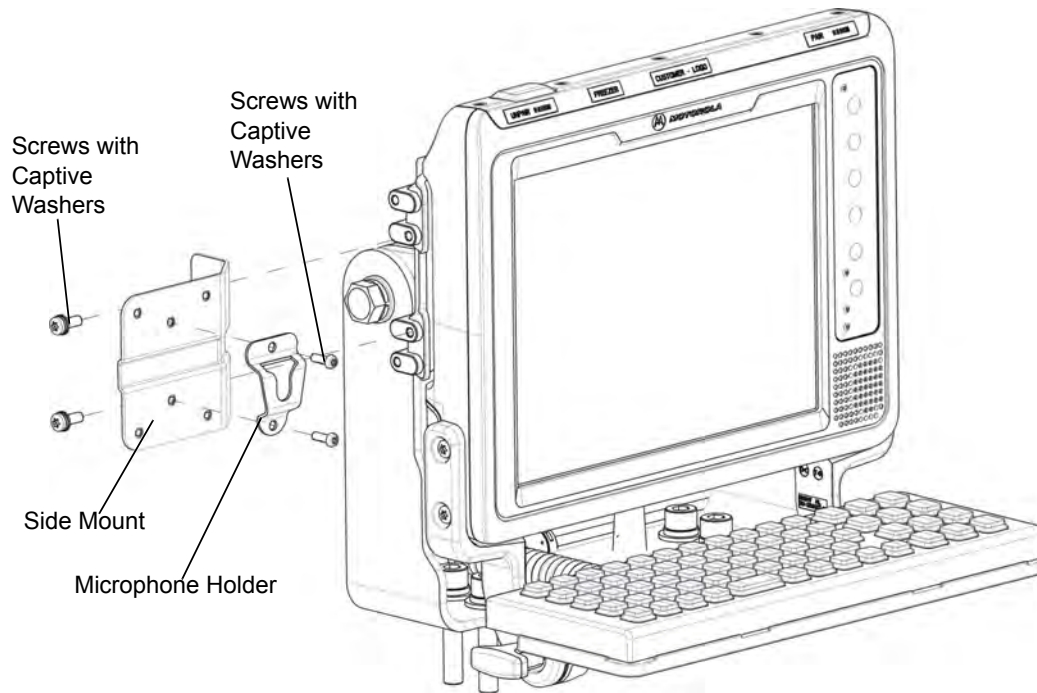


Figure 2-80 *Installing the External Microphone Mount*



Chapter 3 Operating the VC70

Introduction

This chapter explains the buttons, status icons and controls on the VC70 and provides basic instructions for using the VC70, including powering on and resetting. It also included instructions for entering and capturing data.

Quick Access Panel

The Quick Access Panel contains buttons and LEDs to control the operation of the vehicle computer.

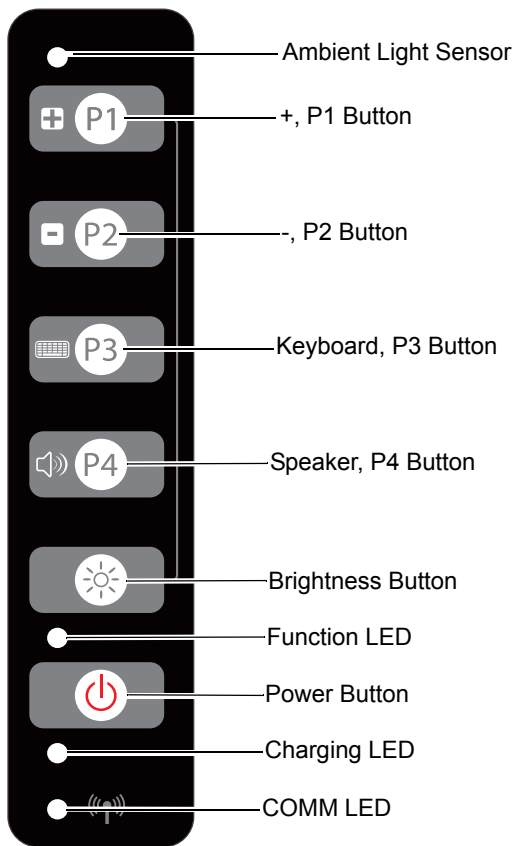


Figure 3-1 VC70 Quick Access Panel

Power Button

Press the Power button to place the vehicle computer into suspend mode. When in suspend mode, press the Power button to resume normal operation.

Charging LED

[Table 3-1](#) lists the states of the charging LED.

Table 3-1 Charging LED Indicator

LED State	Indication
Off	Backup battery charging is not available.
Solid Amber	Backup battery is fully charged (backup battery only available).
Blinking Amber	Backup battery is not full (backup battery only available).
Slow Blinking Amber	Backup battery is low (backup battery only available).
Solid Green	Backup battery is fully charged (both external power and backup battery available).
Blinking Green	Backup battery charging in progress (both external power and backup battery available).

Table 3-1 Charging LED Indicator (Continued)

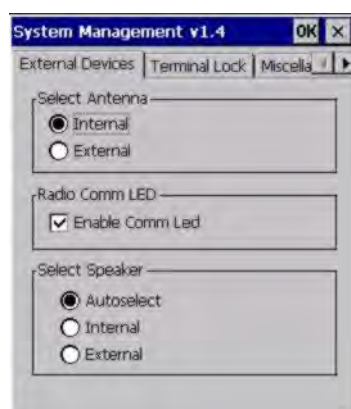
LED State	Indication
Slow Blinking Green	Backup battery is low (both external power and backup battery available).
Solid Red	Back battery not available/Suspend state (external power only available).

COMM LED

The COMM LED blinks to indicate WLAN radio activity. [Table 3-2](#) lists the states of the COMM LED. By default, the COMM LED is enabled. To disable the COMM LED:

✓ **NOTE** These settings are not persistent across a cold boot.

1. Tap **My Device** icon > **Control Panel** icon > **System Management** icon. The **System Management** window displays.

**Figure 3-2** RF Settings Tab Window

2. Tap the **Enable Comm Led** check box.
3. Tap **OK**.

Table 3-2 COMM LED Indicator

LED State	Indication
Solid Green	Excellent, very good or good RSSI signal strength.
Slow Blinking Green (once every 2 seconds)	Poor RSSI signal strength.
Off	WLAN is OFF or not connected – no RSSI signal.

Brightness and Speaker Buttons

The Brightness button places the Quick Access Panel + (P1) and - (P2) buttons into the backlight control mode where you can adjust the brightness of the display. The Speaker button places the Quick Access Panel + (P1) and - (P2) buttons into the audio volume level mode where you can adjust the speaker volume level. See [Adjusting the Brightness on page 3-9](#) and [Adjusting the Volume on page 3-9](#) for more information.

Function LED

The Function LED indicates the mode of display function keys. [Table 3-3](#) lists the states of the Function LED.

Table 3-3 Function LED Indicator

LED State	Indication
Off	Function keys mode. This is a default mode. P1-P4 keys acts as functions.
Solid Amber	“Screen Brightness level” control mode is active for 5 seconds (default).
Blinking Amber	“Audio Volume level” control mode is active for 5 seconds (default).

Programmable (“P”) Keys

The programmable keys on the Quick Access Panel (P1, P2, P3, P4) can be set to perform certain functions, such as:

- Launching an application
- Simulating a key press
- Toggling the SIP keyboard
- Enabling and disabling the touch screen
- Playing a key sequence
- Launching the calibration screen.

✓ **NOTE** These settings are not persistent across a cold boot.

Using the Keyboard

Soft Input Panel (SIP) Keyboards

The VC70 contains three on-screen Soft Input Panel (SIP) keyboards. The VC70 SIP looks and functions like the optional keyboard.

To display the VC70 SIP keyboard, tap the **Input Panel** icon  in the task tray and select either **VC70 Keyboard**, **VC70 AZERTY Keyboard** or **XAMLIM** from the pop-up menu.

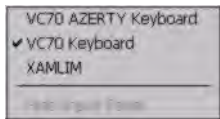


Figure 3-3 Soft Input Panel Pop-up Menu.

✓ **NOTE** SIP will display the last keyboard type that was used.

Figure 3-4



Figure 3-5 QWERTY VC70 Soft Input Panel Keyboards - Normal Size



Figure 3-6 AZERTY VC70 Soft Input Panel Keyboards - Normal Size



Figure 3-7 XAMLIM Soft Input Panel Keyboard

Tap the Enlarge or Reduce Keyboard button to scale the keyboard. The three sizes are small, normal and large with normal being the default size.

To hide or show the numeric keys tap the **Alpha-Numeric Toggle** button.

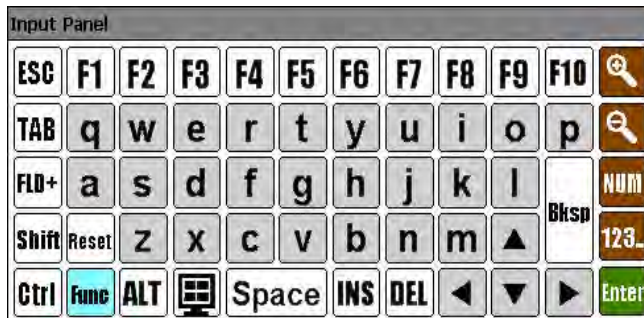


Figure 3-8 Keyboard with Numeric Key Hidden

To only display the numeric keys tap the **Numeric Key Toggle** button.

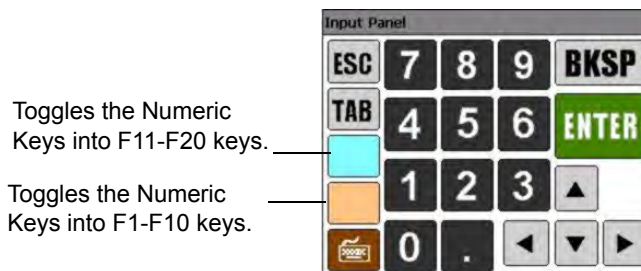


Figure 3-9 Numeric Only Keys

The **FUNC** key, when depressed, displays a second layer of characters. The second layer stays visible until the **FUNC** key is pressed again.

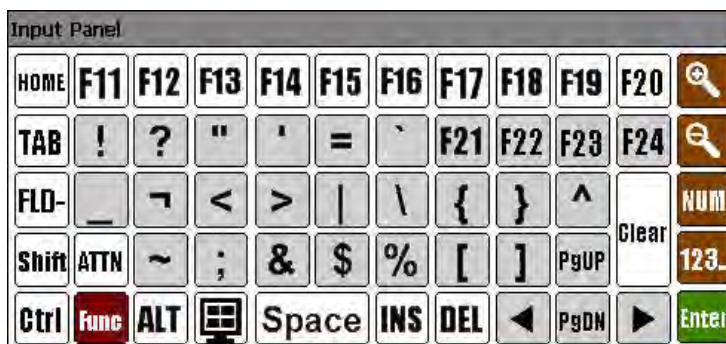


Figure 3-10 QWERTY FUNC Keys

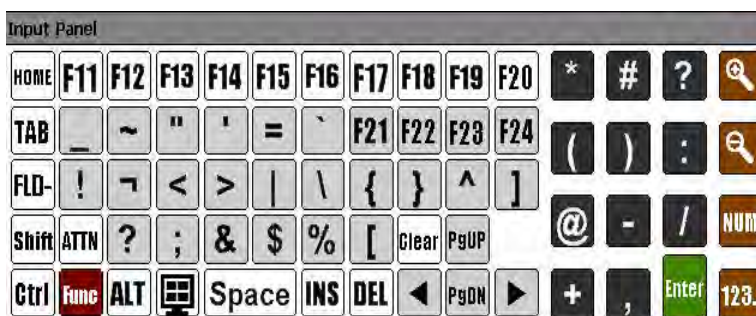


Figure 3-11 AZERTY FUNC Keys

The **SHIFT** key, when depressed, displays the shifted alpha characters on the keyboard. The shifted letters remain until the **SHIFT** key is pressed again.

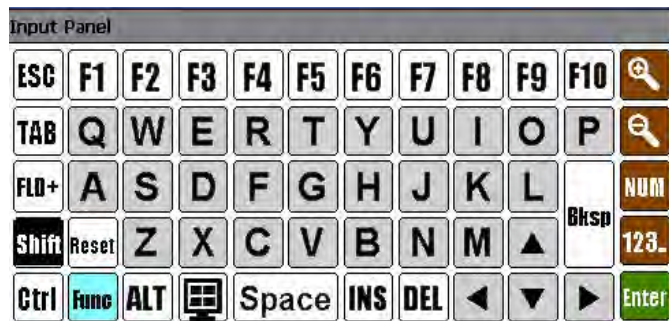


Figure 3-12 QWERTY Shifted Keys



Figure 3-13 AZERTY Shifted Keys

Keyboard Functionality

Optional Numeric, QWERTY and AZERTY keyboards can be used with the vehicle computer. Refer to [Figure 3-14](#), [Figure 3-15](#), [Figure 3-16](#) and [Table 3-4](#) for a description of the keys.

[Table 3-4](#) describes the general functions of the keyboard.

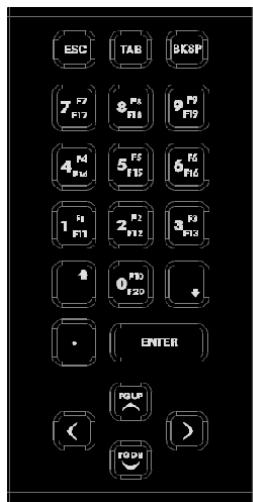


Figure 3-14 VC70 Numeric Keyboard



Figure 3-15 VC70 QWERTY Keyboard



Figure 3-16 VC70 AZERTY Keyboard

Table 3-4 Key Descriptions

Key	Description
SHIFT	Press the SHIFT key followed by a alpha key to create uppercase alphabetic characters.
CTRL	Press the CTRL key to activate alternate control functions. Use CTRL - ESC key combination to access the  menu.
ALT	Press the ALT key to activate alternate keyboard functions.
FUNC	Press the FUNC key to activate alternate functions that are shown on the keyboard in upper text. The key lights to indicate that the keyboard is locked in the function mode. Press the FUNC key again to return to normal keyboard mode.
A through Z	Produces the lowercase alphabetic character shown on the key. Produces uppercase alphabetic character shown on the key when preceded by the SHIFT key.
0 through 9	Produces the numeric character shown on the key.

Table 3-4 Key Descriptions (Continued)

Key	Description
	Moves the cursor around the screen or highlights the items 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.
Del	Deletes the character to the right of the cursor.
Backspace	Deletes the character to the left of the cursor.
Space	Enters a space between characters or words.
 Windows	Allows access the  menu.

Adjusting the Brightness

Controlling Screen Brightness

To adjust the brightness of the screen, press the **Backlight Control** button on the Quick Access Panel. The amber **Backlight Control** LED lights indicating that the VC70 is in the brightness control mode. Press the **P1** button to decrease the brightness or the **P2** button to increase the brightness. Press the **Backlight Control** button to exit this mode (or after five seconds of inactivity the VC70 automatically returns to normal operation). A light sensor sets the screen brightness in accordance to ambient light.

Controlling the External Keyboards Backlight

To adjust the external keyboards backlight intensity press the **FUNC** key and then the arrow right to increase the back light intensity or the arrow left to decrease the backlight intensity.

Adjusting the Volume

You can use the Quick Access Panel Speaker button to place the + (**P1**) and - (**P2**) buttons into the audio volume level mode where you can adjust the speaker volume level.

You can also:

1. Tap the  > **Settings** > **Control Panel** > **Volume & Sounds** icon. The **Volume & Sounds Properties** window appears.

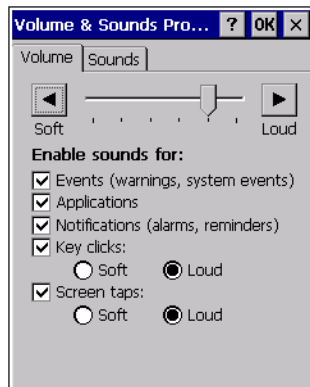


Figure 3-17 Volume and Sounds Properties Window

2. 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.
3. Tap **OK** to save the setting or tap **X** to exit without saving.

✓ **NOTE** To get to MAX volume level, both SW and function volume levels must be on loud.

If an external speaker is connected, the above controls its volume.

Taskbar

The Taskbar at the bottom of the window displays the active programs, current time, battery status and communication status.

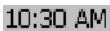


Figure 3-18 Taskbar

Status icons are shown in the taskbar to indicate present status of the vehicle computer. Double tapping each status icon displays the corresponding setup window and enables you to change or adjust its settings from the window.

- **Status Icons:** The status icons indicate the function key status. If the **FUNC**, **SHIFT**, **CTRL** or **ALT** functions are active the appropriate status icon is displayed.
- **Active Programs Icons:** The active applications icons are displayed on the taskbar. If more than one program is active, icons can be used to toggle between the open programs (applications). Tap on a taskbar application to maximize the application.
- **AC Power/Battery Status Icons:** The AC Power/Battery Status icons are shown in the taskbar to indicate the present power supply status of the vehicle computer.

Table 3-5 *Status Icons*

Status Icon	Description
	Indicates the current time.
	Click to display the selected VC70 Soft Input Panel keyboard.
	Indicates that the vehicle computer is receiving power from a forklift battery or from an AC power supply, the UPS is installed and charging. Double tapping on this icon opens the Power Settings window.
	Indicates that the vehicle computer is running on UPS power and indicates the percentage of battery charge left in 10% increments from 10% to 100%. Double tapping on this icon opens the Power Settings window.
	Indicates that the vehicle computer is connected to a host computer via ActiveSync.
	Indicates that the Bluetooth radio is on.
	Indicates that the SHIFT button function is selected.
	Indicates that the FUNC button function is selected.
	Indicates that the CTRL button function is selected.
	Indicates that the ALT character selection is selected.

Start Button

Tap the **Start** button (or press **CTRL > ESC**) to launch the *Start* menu.

- *Programs*: Use to access available programs.
- *Favorites*: Displays files in *Favorites* directory.
- *Documents*: Displays files in *Documents* directory.
- *Settings*: Accesses the Control Panel, the Network and Dial-up Connections and the Taskbar and Start menu.
- *Help*: Accesses the Windows CE Help.
- *Run . . .* : Runs a program or application.
- *Suspend*: Places the mobile computer in the suspend state.

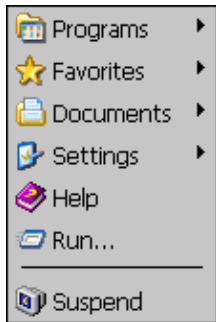


Figure 3-19 *Start Menu*

Programs Menu

From the *Start* menu, tap *Programs* to open the *Programs* menu. The programs provided with Windows CE .NET 5.0 Professional are displayed in the *Programs* menu. Refer to the *Symbol Application Guide*, p/n 72-68901-xx and the *Microsoft® Applications User Guide for Symbol Devices*, p/n 72E-68197-xx for application information.



Figure 3-20 *Programs Menu*

Desktop Button

Use the *Desktop* button to minimize all open programs and display the desktop.

Task Manager and Properties

Use the Task Manager to control an application's use and use the *Properties* functions to set display and clock options.

Task Manager

1. Select **ALT - TAB**, to display the *Task Manager* window.

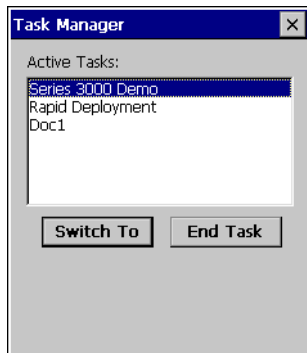


Figure 3-21 Task Manager Window

2. Tap a task in the *Active Tasks* list and tap **Switch To** to make that task the primary task, or tap **End Task** to end the selected task.
3. Tap **X** to exit the *Task Manager* window.

Properties

1. Tap **Start > Control Panel > Taskbar and Start Menu ...**. The *Task Manager and Start Menu* window displays.
2. This menu provides taskbar options:
 - Check the *Always on Top* checkbox to keep the taskbar on top of all other windows.
 - Check the *AutoHide* checkbox to make the taskbar disappear, touch the bottom of the display to make the taskbar return.
 - Check the *Show Clock* checkbox to display the clock on the taskbar.
3. Tap **OK** to save the settings and exit the window.

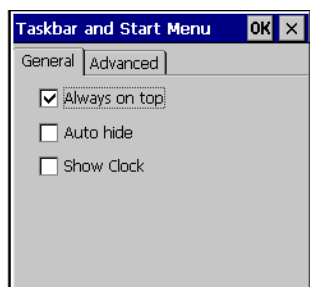


Figure 3-22 Taskbar and Start Menu, General Tab

Advanced Tab

1. Tap the *Advanced* tab.
2. Tap the **Clear** button to delete all of the documents listed in the *Start - Documents* entry, see [Start Button on page 3-11](#). Typically this list is empty, but if there were documents in the list the **Clear** button would delete them.
3. Tap the *Expand Control Panel* checkbox to display the entire contents of the control panel in list form.



Figure 3-23 *Taskbar and Start Menu - Advanced Tab*

4. Tap **OK** to save the settings and exit the window.

Using Voice Communication

You may connect an external speaker to your vehicle computer. Use a Motorola HSN4040 15 Watt water-resistant loudspeaker and connect it to the VC70 External Speaker connector using the adapter cable (PN 25-159552-01).

✓ **NOTE** When connecting the adapter cable, the audio is automatically routed to the external speaker. If the external speaker is not connected, you will not be able to hear any audio.

You may also connect an external PTT microphone to your vehicle computer and use it for voice communication and voice recording using the CE built in capabilities. Connect the external microphone (HMN1089B) to the Microphone connector.

For recording, perform the following:

1. Tap the  > **Programs** > **Samples**. The **Samples** window appears.
2. Tap the **Sounds** icon. The following sound control window appears.



Figure 3-24 Sound Control Window

3. To record your voice, press the PTT button and the .
4. To stop recording, press the  and release the PTT button.
5. To listen to your recording, press the .

Resetting the Vehicle Computer

There are two reset functions, warm boot and cold boot.

Performing a Warm Boot

A warm boot restarts the vehicle computer and saves all stored records and entries. In the Windows CE environment.

✓ **NOTE** Files that remain open during a warm boot may not be retained.

To perform a warm boot:

- Press the Power button on the Quick Access Panel continuously for 5 seconds
or
- Tap  > Programs > Warm Boot.

Performing a Cold Boot

A cold boot restarts the vehicle computer. To perform a cold boot when external power is connected, simultaneously press the **P1**, **P3** and the **Power** button on the Quick Access Panel.

A cold boot also restarts the vehicle computer, but erases all stored records and entries in RAM. Data saved in flash memory or a memory card is not lost. In addition it returns formats, preferences and other settings to the factory default settings.

✓ **NOTE** Any data previously synchronized with a computer can be restored during the next ActiveSync operation.

Power States

Power On

Entered when external or/and good internal backup battery is connected. The backup battery is electrically disconnected until the external power connected to the computer for the first time. In this state, The computer is up and running, its components are powered up, and the display is on.

Power Suspend

Entered only if the backup battery is connected. The computer looks like in "power off" state but vital system components, including wake-up sources are still running. Other device components are either powered off, or put in the lowest available power consumption modes.

Methods of Suspension

The VC70 operation can be suspended in three ways:

- **Manual suspension:** the operator presses the Power button when the vehicle computer is on.

- **API suspension:** the application requests a suspend via an API call.
- **Time-out suspension:** suspends after the vehicle computer is not used for a set amount of time. Tap  > **Settings** > **Control Panel** > **Power** icon > select the **Advanced** tab to set the time-out value.

Power Unattended

Entered only if an external DC power is connected. This is a special sub-case of power suspend for external DC power only.

Critical Suspension

Critical suspension occurs when input power is not available and the Backup battery is discharged to a low state that is reserved for backup data retention. During critical suspension all circuitry is shutdown except for memory retention and the real-time clock. During critical suspension the VC70 is receiving power from the backup battery. The backup battery retains data for at least 72 hours. Critical suspension occurs when:

- The VC70 is receiving power from the Backup battery and the battery discharges to a low capacity.

Waking the Vehicle Computer

The wakeup conditions define what actions wakeup the vehicle computer after it has gone into suspend mode. The vehicle computer can go into suspend mode by either pressing the Power button on the Quick Access Panel or automatically by control panel timeout settings. Tap  > **Settings** > **Control Panel** > **Power** icon > **Wakeup** tab.

These settings are configurable and the factory default settings are shown in [Table 3-6](#).

Table 3-6 Wakeup Default Settings

Condition for Wakeup	Power Button	Automatic TimeOut
External power (AC or DC) is applied.	No	Yes
Forklift Ignition turns on.	No	Yes
Forklift Ignition turns off.	No	No
VC70 is connected to a serial device.	No	Yes
VC70 is connected to a USB device.	No	Yes
VC70 is disconnected from a USB device.	No	Yes
A key is pressed.	No	Yes
An attached scanner is triggered.	No	Yes
Screen is touched.	No	No

Reduced Power Consumption

During the Reduced Power Consumption mode, the device is powered by the backup battery.

[Table 3-7](#) shows the reduced power consumption mode active components.

Table 3-7 Reduced Power Consumption Mode

VC70 Component	Active
CPU	On
Sensor Micro	On
Display backlight	Level 1
WLAN state (On)	On (not connected)
WLAN state (connected)	On (connected)
WLAN state (in PTT call)	On (external speaker is disconnected)
Bluetooth	No change
Touch screen heater	Off
RS232#1 5Vout	Off
RS232#2 5Vout	Off
USB#1 5Vout (external keyboard)	Off
USB#2 5Vout	Off
External RS232/USB peripherals	Off
External speaker	Off
External microphone	On
Ethernet	Off
CAN bus	Off
Temperature/Humidity sensor	On
Ambient light sensor	Off
Accelerometer	On

Calibrating the Screen

Using the Display



CAUTION Do not use sharp objects when touching the screen. Use your finger tip or a stylus when touching the screen.

This section describes how to calibrate the VC70 touch screen. If the current calibration does not allow for easy touch screen input or you want to recalibrate the screen at any time, refer to [Using the Keyboard on page 3-19](#).



NOTE Use a Stylus for the screen calibration.

To calibrate your VC70:

1. Tap  > **Settings** > **Control Panel** > **Stylus icon** > **Calibration** tab.



Figure 3-25 Stylus Properties - Calibration Tab Window

2. Tap the **Recalibrate** button. The calibration screen displays.

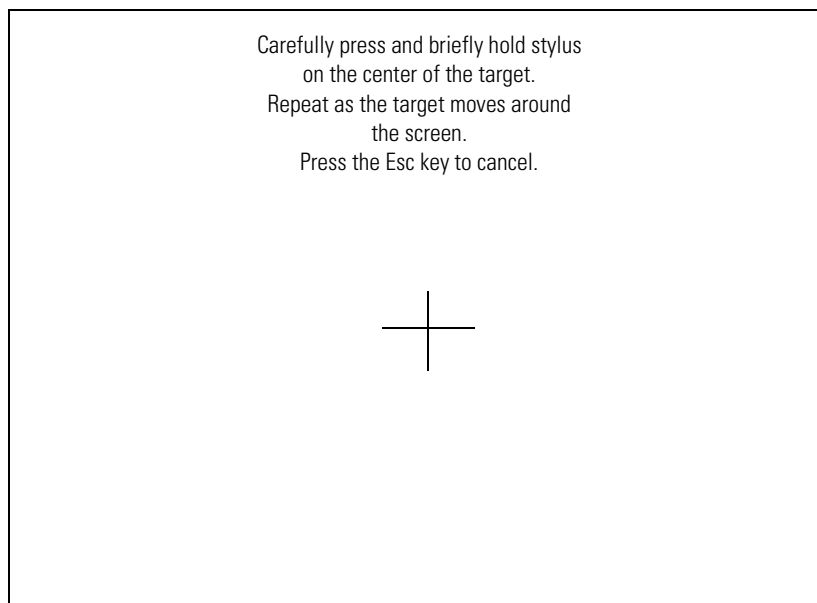


Figure 3-26 Calibration Screen

3. As the screen instructs, carefully touch and briefly hold on the center of each target that appears on the screen. Repeat as the target moves around the screen.
4. Tap the screen to accept the new calibration.



NOTE If the calibration screen fails to respond, contact Support Central for assistance.

Using the Keyboard

If the present calibration does not allow you to use the touch screen, use the externally connected keyboard (or any standard USB keyboard) to access the calibration:

1. Press **Ctrl + Esc** keys to access the **Start** menu.
2. Using the arrow keys, select **Settings > Control Panel**.
3. Press **Enter** to display the **Control Panel** window.

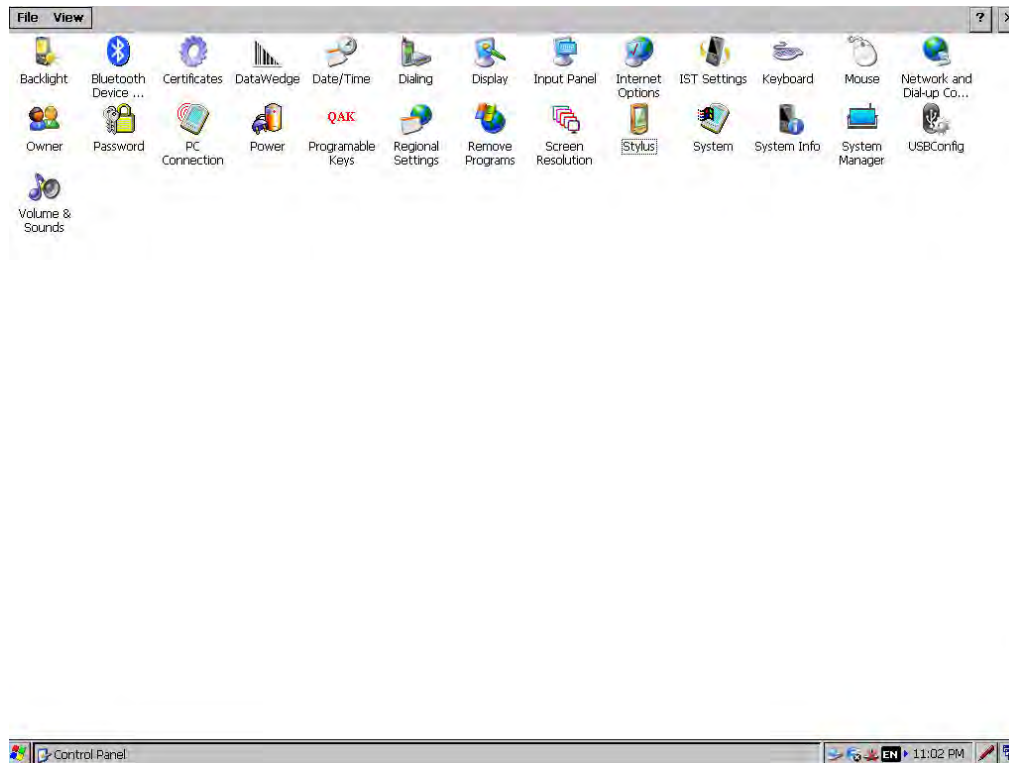


Figure 3-27 Control Panel Window

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

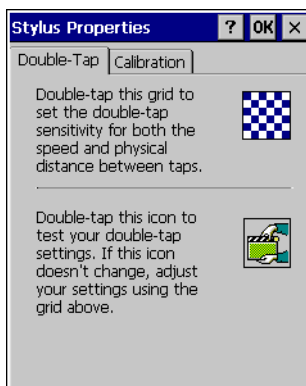


Figure 3-28 Stylus Properties Window

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



Figure 3-29 Stylus Properties Calibration Tab Window

6. Using the **Tab** key, select the **Recalibrate** button.
7. Press the space key to start the calibration process. The calibration screen appears.

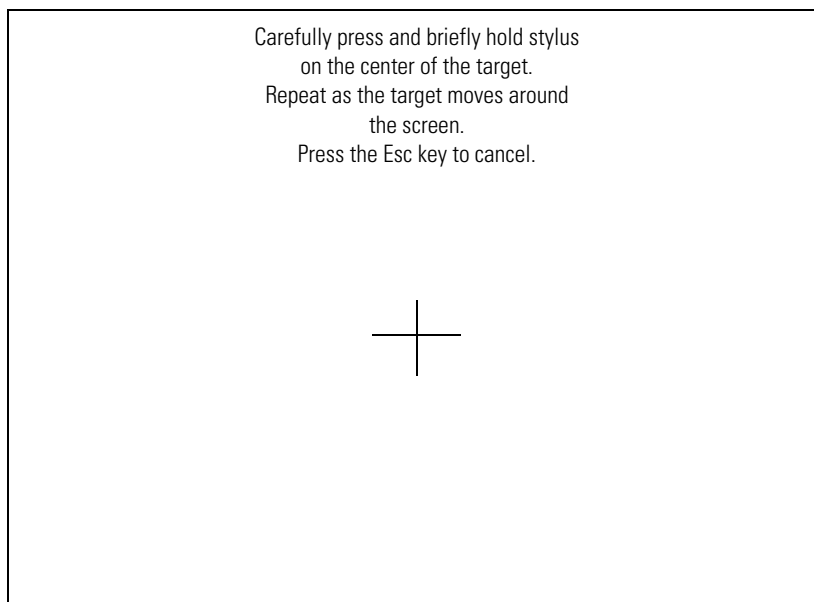


Figure 3-30 Calibration Screen

8. As the screen instructs, carefully touch and briefly hold 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 calibration screen fails to respond, contact Support Central for assistance.

Checking Battery Status

To check whether the backup battery in the vehicle computer is charged, tap  > **Settings** > **Control Panel** > **Power** icon to display the **Power Settings** window.

To save battery power, set the vehicle computer to turn off after a specified number of minutes.

Ignition Sensing

The vehicle computer contains an Ignition Sense feature that detects when the ignition switch is turned off and shuts the vehicle computer down after a preprogrammed timeout. This feature allows the operator to use the vehicle computer for a predetermined time period after the ignition switch is turned off, then shuts the vehicle computer down automatically to prevent over-discharge of the forklift battery. The timeout period is adjustable by the user. The normal current draw of a suspended vehicle computer is approximately 500mA. When the vehicle computer shuts down using the Ignition Sense feature, current draw is reduced to approximately 5 mA. This feature provides the automatic shutoff functionality of an external relay, without requiring an actual relay and has the added benefit of allowing the user to work for a preset time period before shutting down.

The power cable must be connected to the ignition switch. See [12 Volt Internal Combustion Engine Forklifts on page 2-11](#) for information on connecting the power cable to enable the Ignition Sense feature.

✓ **NOTE** These settings are not persistent across a cold boot.

1. Tap  > **Settings** > **Control Panel** > **VC70 System Management** icon. The **System Management** window displays.
2. Select the **Miscellaneous** tab.

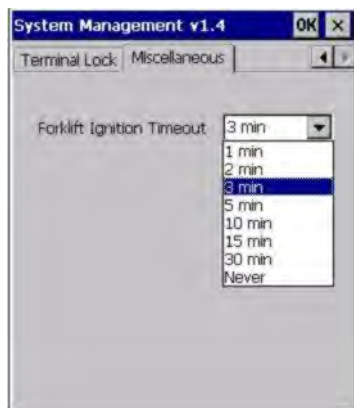


Figure 3-31 Miscellaneous Tab Window

3. In the **Forklift Ignition Timeout** drop-down list, select the amount of time before the vehicle computer shuts down after the ignition switch is turned off.
4. Tap **OK**.

Chapter 4 Wireless Applications

Introduction

Figure 4-1 Wireless Local Area Networks (WLANs) allow mobile computers to communicate wirelessly and send data to a host device in real time. Before using the vehicle computer on a WLAN, the facility must be set up with the required hardware to run the wireless LAN and the vehicle computer must be configured. Refer to the documentation provided with the access points (APs) for instructions on setting up the hardware.



NOTE The Wireless LAN operation in your vehicle computer is active by default.

To configure the vehicle computer, a set of wireless applications provide the tools to configure and test the wireless radio in the vehicle computer. The **Wireless Application** menu on the task tray provides the following wireless applications:

- Wireless Status
- Wireless Diagnostics
- Find WLANs
- Manage Profiles
- Options
- Log On/Off
- Enable/Disable Radio (Fusion 2.5 and above only).

Tap the  > **Programs** > **Fusion** > **Wireless Launch** to display the **Wireless Applications** menu.

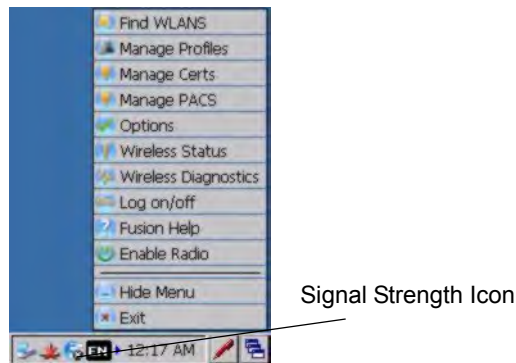


Figure 4-2 *Wireless Applications Menu*

Signal Strength Icon

The **Signal Strength** icon in the task tray indicates the mobile computer's wireless signal strength as follows:

Table 4-1 Wireless Applications Icons, Signal Strength Descriptions

Icon	Status	Action
	Excellent signal strength	Wireless LAN network is ready to use.
	Very good signal strength	Wireless LAN network is ready to use.
	Good signal strength	Wireless LAN network is ready to use.
	Fair signal strength	Wireless LAN network is ready to use. Notify the network administrator that the signal strength is only "Fair".
	Poor signal strength	Wireless LAN network is ready to use. Performance may not be optimum. Notify the network administrator that the signal strength is "Poor".
	Out-of-network range (not associated)	No wireless LAN network connection. Notify the network administrator.
	No wireless LAN network card detected.	No wireless LAN network card detected or radio disabled. Notify the network administrator.

Turning the WLAN Radio On and Off

With Fusion

To turn the WLAN radio off tap the **Signal Strength** icon and select **Disable Radio**.

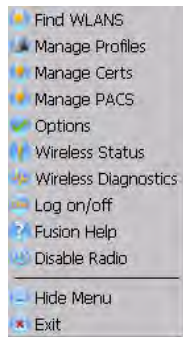


Figure 4-3 *Disable Radio*

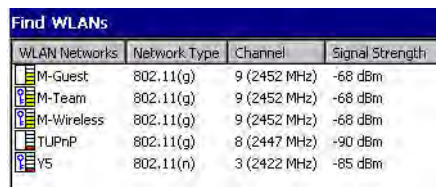
To turn the WLAN radio on tap the **Signal Strength** icon and select **Enable Radio**.



Figure 4-4 *Enable Radio*

Find WLANs Application

Use the **Find WLANs** application to discover available networks in the vicinity of the user and mobile computer. To open the **Find WLANs** application, tap the **Signal Strength** icon - **Find WLANs**. The **Find WLANs** window displays.



WLAN Networks	Network Type	Channel	Signal Strength
M-Guest	802.11(g)	9 (2452 MHz)	-68 dBm
M-Team	802.11(g)	9 (2452 MHz)	-68 dBm
M-Wireless	802.11(g)	9 (2452 MHz)	-68 dBm
TUPnP	802.11(g)	8 (2447 MHz)	-90 dBm
V5	802.11(n)	3 (2422 MHz)	-85 dBm

Figure 4-5 Find WLANs Window

✓ **NOTE** Find WLAN display is limited to 32 items (ESSIDs or MAC addresses). A combination of up to 32 ESSIDs/APs may be displayed.

Manually enter valid ESSIDs not displayed in the **Find WLANs** window. See [Figure 4-6 on page 4-5](#).

The **Find WLANs** list displays:

- **WLAN Networks** - Available wireless networks with icons that indicate signal strength and encryption type. The signal strength and encryption icons are described in [Table 4-2](#) and [Table 4-3](#).
- **Network Type** - Type of network.
- **Channel** - Channel on which the AP is transmitting.
- **Signal Strength** - The signal strength of the signal from the AP.

Table 4-2 Signal Strength Icon

Icon	Description
	Excellent signal
	Very good signal
	Good signal
	Fair signal
	Poor signal
	Out of range or no signal

Table 4-3 Encryption Icon

Icon	Description
	No encryption. WLAN is an infrastructure network.
	WLAN is an Ad-Hoc network.
	WLAN access is encrypted and requires a password.

Tap-and-hold on a WLAN network to open a pop-up menu which provides three options: **Connect to...**, **Create profile** and **Refresh**. Select **Refresh** to refresh the WLAN list. Select **Connect to...** to connect to the network or **Create profile** to create a wireless profile from that network. This starts the **Wireless LAN Profile Entry** which allows you to set the values for the selected network. After editing the profile, the vehicle computer automatically connects to this new profile.

Profile Editor Wizard

Use the **Manage Profiles** to create a new profile or edit an existing profile. If editing a profile, the fields reflect the current settings for that profile. If creating a new profile, the known information for that WLAN network appears in the fields.

Navigate through the wizard using the **Next** and **Back** buttons. Tap **X** to quit. On the confirmation dialog box, tap **No** to return to the wizard or tap **Yes** to quit and return to the **Manage Profiles** window. See [Manage Profiles Application on page 4-22](#) for instructions on navigating the **Profile Editor Wizard**.

Profile ID

In the **Profile ID** dialog box in the **Profile Editor Wizard**, enter the profile name and the ESSID.

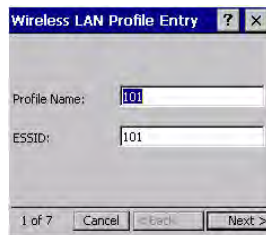


Figure 4-6 Profile ID Dialog Box

Table 4-4 Profile ID Fields

Field	Description
Name	The name and (WLAN) identifier of the network connection. Enter a user friendly name for the mobile computer profile used to connect to either an AP or another networked computer. Example: The Public LAN.
ESSID	The ESSID is the 802.11 extended service set identifier. The ESSID is 32-character (maximum) string identifying the WLAN, and must match the AP ESSID for the vehicle computer to communicate with the AP.

✓ **NOTE** Two profiles with the same user friendly name are acceptable but not recommended.

Tap **Next**. The **Operating Mode** dialog box displays.

Operating Mode

Use the **Operating Mode** dialog box to select the operating mode (Infrastructure or Ad-Hoc) and the country location.

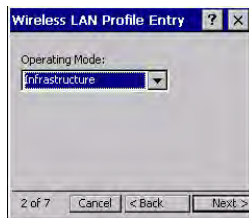


Figure 4-7 Operating Mode Dialog Box

Table 4-5 Operating Mode Fields

Field	Description
Operating Mode	Select Infrastructure to enable the vehicle computer to transmit and receive data with an AP. Infrastructure is the default mode. Select Ad Hoc to enable the vehicle computer to form its own local network where mobile computers communicate peer-to-peer without APs using a shared ESSID.
Country	Country determines if the profile is valid for the country of operation. The profile country must match the country in the options page or it must match the acquired country if 802.11d is enabled. Single Country Use: When the device is only used in a single country, set every profile country to Allow Any Country. In the Options > Regulatory dialog box (see Figure 4-47 on page 4-34), select the specific country the device is used in, and deselect the Enable 802.11d option. This is the most common and efficient configuration, eliminating the initialization overhead associated with acquiring a country via 802.11d. Multiple Country Use: When the device is used in more than one country, select the Enable 802.11d option in the Options > Regulatory dialog box (see Figure 4-47 on page 4-34). This eliminates the need for reprogramming the country (in Options > Regulatory) each time you enter a new country. However, this only works if the infrastructure (i.e., APs) supports 802.11d (some infrastructures do not support 802.11d, including some Cisco APs). When the Enable 802.11d option is selected, the Options > Regulatory > Country setting is not used. For a single profile that can be used in multiple countries, with infrastructure that supports 802.11d (including Symbol infrastructure), set the Profile Country to Allow Any Country. Under Options > Regulatory, select Enable 802.11d. The Options > Regulatory > Country setting is not used.

Table 4-5 Operating Mode Fields (Continued)

Field	Description
Country (Continued)	For a single profile that can be used in multiple countries, but with infrastructure that does not support 802.11d, set the profile country to Allow Any Country, and de-select (uncheck) Enable 802.11d. In this case, the Options > Regulatory > Country setting must always be set to the country the device is currently in. This configuration option is the most efficient and may be chosen for use with any infrastructure. However, the Options > Regulatory > Country setting must be manually changed when a new country is entered. Note that using a single profile in multiple countries implies that there is a common ESSID to connect to in each country. This is less likely than having unique ESSIDs in each country, this requires unique profiles for each country.
	For additional efficiency when using multiple profiles that can be used in multiple countries, the country setting for each profile can be set to a specific country. If the current country (found via 802.11d or set by Options > Regulatory > Country when 802.11d is disabled) does not match the country set in a given profile, then that profile is disabled. This can make profile roaming occur faster. For example, if two profiles are created and configured for Japan, and two more profiles are created and configured for USA, then when in Japan only the first two profiles are active, and when in USA only the last two are active. If they had all been configured for Allow Any Country, then all four would always be active, making profile roaming less efficient.

Tap **Next**. If **Ad-Hoc** mode was selected the **Ad-Hoc** dialog box displays. If **Infrastructure** mode was selected the **Authentication** dialog box displays. See [Authentication on page 4-8](#) for instruction on setting up authentication.

Ad-Hoc

Use the **Ad-Hoc** dialog box to select the required information to control **Ad-Hoc** mode. This dialog box does not appear if you selected **Infrastructure** mode. The channels listed are dependent upon the band selected in the **Options > Band Selection** window. See [Band Selection on page 4-34](#) for more information. To select Ad-Hoc mode:

1. Select a channel number from the **Channel** drop-down list.

Table 4-6 Ad-Hoc Channels

Band	Channel	Frequency
2.4 GHz	1	2412 MHz
	2	2417 MHz
	3	2422 MHz
	4	2427 MHz
	5	2432 MHz
	6	2437 MHz
	7	2442 MHz
	8	2447 MHz
	9	2452 MHz
	10	2457 MHz
	11	2462 MHz

Table 4-6 Ad-Hoc Channels

Band	Channel	Frequency
5 GHz	36	5180 MHz
	40	5200 MHz
	44	5220 MHz
	48	5240 MHz

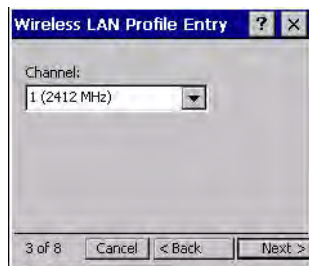


Figure 4-8 Ad-Hoc Settings Dialog Box

2. Tap **Next**. The **Encryption** dialog box displays. See [Encryption on page 4-16](#) for encryption options.

Authentication

Use the **Authentication** dialog box to configure authentication. If you selected **Ad-Hoc** mode, this dialog box is not available and authentication is set to **None** by default.

Select an authentication type from the drop-down list and tap **Next**. Selecting **PEAP** or **TTLS** displays the **Tunneled** dialog box. Selecting **None**, **EAP TLS**, or **LEAP** displays the **Encryption** dialog box. See [Encryption on page 4-16](#) for encryption options. [Table 4-7](#) lists the available authentication options.



Figure 4-9 Authentication Dialog Box

Table 4-7 Authentication Options

Authentication	Description
None	Default setting when authentication is not required on the network.
EAP-TLS	Select this option to enable EAP-TLS authentication. EAP-TLS is an authentication scheme through IEEE 802.1x. It authenticates users and ensures only valid users can connect to the network. It also restricts unauthorized users from accessing transmitted information by using secure authentication certificates.
PEAP	Select this option to enable PEAP authentication. This method uses a digital certificate to verify and authenticate a user's identity.
LEAP	Select this option to enable LEAP authentication, which is based on mutual authentication. The AP and the connecting mobile computer require authentication before gaining access to the network.
TTLS	Select this option to enable TTLS authentication.

Tunneled Authentication

Use the **Tunneled Authentication** dialog box to select the tunneled authentication options. There are different selections available for PEAP or TTLS authentication.

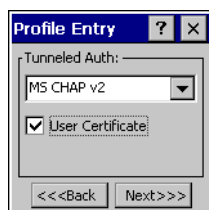


Figure 4-10 Tunneled Authentication Dialog Box

To select a tunneled authentication type:

1. Select a tunneled authentication type from the drop-down list. See [Table 4-8](#) and [Table 4-9](#).
2. Select the **User Certificate** check box if a certificate is required. If you selected the TLS tunnel type that requires a user certificate, the check box is already selected.
3. Tap **Next**. The **Installed User Certificates** dialog box appears.

[Table 4-8](#) lists the PEAP tunneled authentication options.

Table 4-8 PEAP Tunneled Authentication Options

PEAP Tunneled Authentication	Description
MS CHAP v2	Microsoft Challenge Handshake Authentication Protocol version 2 (MS CHAP v2) is a password-based, challenge-response, mutual authentication protocol that uses the industry-standard Message Digest 4 (MD4) and Data Encryption Standard (DES) algorithms to encrypt responses. The authenticating server challenges the access client and the access client challenges the authenticating server. If either challenge is not correctly answered, the connection is rejected. MS CHAP v2 was originally designed by Microsoft as a PPP authentication protocol to provide better protection for dial-up and virtual private network (VPN) connections. With Windows XP SP1, Windows XP SP2, Windows Server 2003, and Windows 2000 SP4, MS CHAP v2 is also an EAP type.
TLS	EAP TLS is used during phase 2 of the authentication process. This method uses a user certificate to authenticate.

[Table 4-9](#) lists the TTLS tunneled authentication options.

Table 4-9 TTLS Tunneled Authentication Options

TTLS Tunneled Authentication	Description
CHAP	Challenge Handshake Authentication Protocol (CHAP) is one of the two main authentication protocols used to verify the user name and password for PPP Internet connections. CHAP is more secure than PAP because it performs a three way handshake during the initial link establishment between the home and remote machines. It can also repeat the authentication anytime after the link is established.
MS CHAP	Microsoft Challenge Handshake Authentication Protocol (MS CHAP) is an implementation of the CHAP protocol that Microsoft created to authenticate remote Windows workstations. MS CHAP is identical to CHAP, except that MS CHAP is based on the encryption and hashing algorithms used by Windows networks, and the MS CHAP response to a challenge is in a format optimized for compatibility with Windows operating systems.
MS CHAP v2	MS CHAP v2 is a password based, challenge response, mutual authentication protocol that uses the industry standard Message Digest 4 (MD4) and Data Encryption Standard (DES) algorithms to encrypt responses. The authenticating server challenges the access client and the access client challenges the authenticating server. If either challenge is not correctly answered, the connection is rejected. MS CHAP v2 was originally designed by Microsoft as a PPP authentication protocol to provide better protection for dial-up and virtual private network (VPN) connections. With Windows XP SP1, Windows XP SP2, Windows Server 2003, and Windows 2000 SP4, MS CHAP v2 is also an EAP type.
PAP	Password Authentication Protocol (PAP) has two variations: PAP and CHAP PAP. It verifies a user name and password for PPP Internet connections, but it is not as secure as CHAP, since it works only to establish the initial link. PAP is also more vulnerable to attack because it sends authentication packets throughout the network. Nevertheless, PAP is more commonly used than CHAP to login to a remote host like an Internet service provider.
MD5	Message Digest-5 (MD5) is an authentication algorithm developed by RSA. MD5 generates a 128-bit message digest using a 128-bit key, IPSec truncates the message digest to 96 bits.

User Certificate Selection

If you checked the **User Certificate** check box on the **Tunneled Authentication** dialog box or if **TLS** is the selected authentication type, the **Installed User Certificates** dialog box displays. Select a certificate from the drop-down list of currently installed certificates before proceeding. The selected certificate's name appears in the drop-down list. If the required certificate is not in the list, install it.

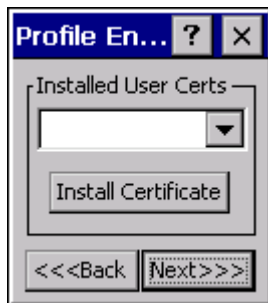


Figure 4-11 Installed User Certificates Dialog Box

User Certificate Installation

To install a user certificate (EAP TLS only) and a server certificate for EAP TLS and PEAP authentication:

1. Tap **Install Certificate**. The **Credentials** dialog box appears.

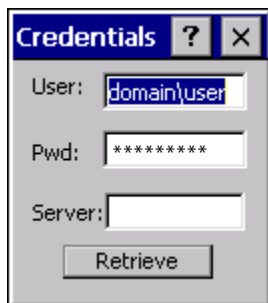


Figure 4-12 Credentials Dialog Box

2. Enter the **User:**, **Pwd:** (password), and **Server:** information in their respective text boxes.
3. Tap **Retrieve**. A **Progress** dialog indicates the status of the certificate retrieval.
4. Tap **ok** to exit.

After the installation completes, the **Installed User Certs** dialog box displays and the certificate is available in the drop-down for selection.



NOTE To successfully install a user certificate, the vehicle computer must already be connected to a network from which the server is accessible.

Server Certificate Selection

If you select the **Validate Server Certificate** check box, a server certificate is required. Select a certificate on the **Installed Server Certificates** dialog box. An hour glass may appear as the wizard populates the existing certificate list. If the required certificate is not listed, install it:

1. Tap the **Install Certificate** button.

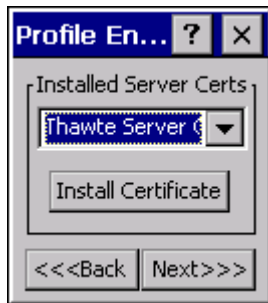


Figure 4-13 *Installed Server Certificates Dialog Box*

A dialog box appears that lists the currently loaded certificate files found in the default directory (Application) with the default extension.

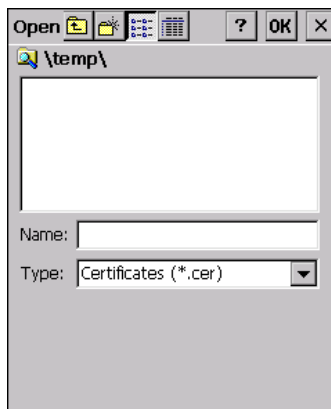


Figure 4-14 *Browse Server Certificates*

2. Navigate to the folder where the certificate is stored. Tap the certificate filename and then tap **ok**.
3. A confirmation dialog verifies the installation. If the information in this dialog is correct, tap the **Yes** button, If the information in this dialog is not correct tap the **No** button. The wizard returns to the **Installed Server Certs** dialog box.

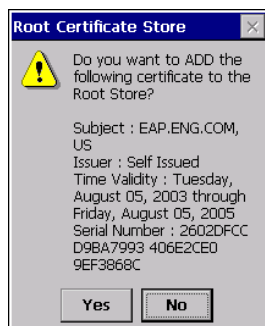


Figure 4-15 *Confirmation Dialog Box*

Credential Cache Options

If you selected any of the password-based authentication types, you can select different credential caching options. These options specify when the network credential prompts appear: at connection, on each resume, or at a specified time.

Entering the credentials directly into the profile permanently caches the credentials. In this case, the vehicle computer does not require user login. If a profile does not contain credentials entered through the configuration editor, you must log in to the vehicle computer before connecting.

Caching options only apply on credentials entered through the login dialog box.

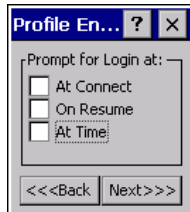


Figure 4-16 Prompt for Login at Dialog Box

If the vehicle computer does not have the credentials, you are prompted to enter a username and password. If the vehicle computer has the credentials (previous entered via a login dialog box), it uses these credentials unless the caching options require the vehicle computer to prompt for new credentials. If you entered the credentials via the profile, the vehicle computer does not prompt for new credentials. [Table 4-10](#) lists the caching options.

Table 4-10 Cache Options

	Description
At Connect	Select this option to prompt for credentials whenever the mobile computer tries to connect to a new profile. Deselect this to use the cached credentials to authenticate. If the credentials are not cached, you are prompted to enter credentials. This option only applies when logged in.
On Resume	Selecting this reauthenticates an authenticated user when a suspend/resume occurs. Once reauthenticated, the user is prompted for credentials. If the user does not enter the same credentials that were entered prior to the suspend/resume within three attempts, the user is disconnected from the network. This option only applies when logged in.
At Time	Select this option to perform a local verification on an authenticated user at a specified time. The time can be an absolute time or a relative time from the authentication, and should be in at least 5 minute intervals. Once the time has passed, the user is prompted for credentials. If the user does not enter the correct credentials within three attempts, the user is disconnected from the network. This option only applies when logged in.

Entering credentials applies these credentials to a particular profile. Logging out clears all cached credentials. Editing a profile clears all cached credentials for that profile.

The following authentication types have credential caching:

- EAP TLS
- PEAP
- LEAP
- TTLS.

Selecting the **At Time** check box displays the **Time Cache Options** dialog box.

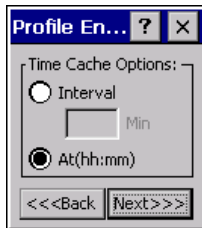


Figure 4-17 Time Cache Options Dialog Box

1. Tap the **Interval** radio button to check credentials at a set time interval.
2. Enter the value in minutes in the **Min** box.
3. Tap the **At (hh:mm)** radio button to check credentials at a set time.
4. Tap **Next**. The **At Time** dialog box appears.

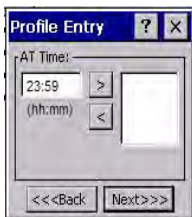


Figure 4-18 At Time Dialog Box

5. Enter the time using the 24 hour clock format in the **(hh:mm)** box.
6. Tap **>** to move the time to the right. Repeat for additional time periods.
7. Tap **Next**. The **User Name** dialog box displays.

User Name

The user name and password can be entered (but is not required) when the profile is created. When a profile authenticates with credentials that were entered in the profile, caching rules do not apply. Caching rules only apply on credentials that are entered through the login dialog box.

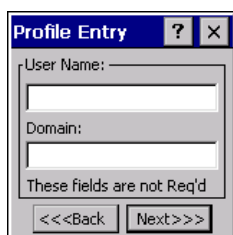


Figure 4-19 Username Dialog Box

Password

Use the **Password** dialog box to enter a password. If EAP/TLS is the selected authentication type, the password is not required and the field is disabled.



Figure 4-20 Password Dialog Box

1. Enter a password in the **Password** field.
2. Select the *Advanced ID* check box, if advanced identification is required.
3. Tap **Next**. The *Encryption* dialog box displays. See [Encryption on page 4-16](#).

Advanced Identity

Use the *Advanced ID* dialog box to enter the 802.1X identity to supply to the authenticator. This value can be 63 characters long and is case sensitive. In TTLS and PEAP, it is recommended entering the identity *anonymous* (rather than a true identity) plus any desired realm (e.g., anonymous@myrealm). A user ID is required before proceeding.

✓ **NOTE** When authenticating with a Microsoft IAS server, do not use advanced identity.

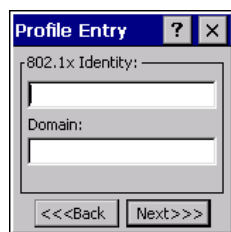


Figure 4-21 Advanced Identity Dialog Box

Tap **Next**. The **Encryption** dialog box displays.

Encryption

Use the **Encryption** dialog box to select an encryption type. The drop-down list includes encryption types available for the selected authentication type. See [Table 4-12](#) for these encryption types.

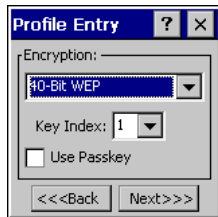


Figure 4-22 Encryption Dialog Box

Table 4-11 Encryption Options

Encryption	Description
Open	Select Open (the default) when no data packet encryption is needed over the network. Selecting this option provides no security for data transmitting over the network.
40-Bit WEP	Select 40-Bit WEP to use 40-bit key length WEP encryption. WEP keys are manually entered in the edit boxes. Only the required number of edit boxes for a key length is displayed (10 Hex digit value for 40-bit keys). Use the Key Index drop-down list to configure the four WEP keys. The adapter uses the selected key. Note: The default Hex digit keys are visible any time they are used. As a security precaution after setting the key values for the network, the digits are replaced with asterisks * in the encryption key fields. If the associated AP uses an optional passkey, the active adapter WLAN profile must use one as well. The passkey is a plain text representation of the WEP keys displayed in the encryption dialog box. The passkey provides an easy way to enter WEP key data without having to remember the entire 40-bit (10 character) Hex digit string.
128-Bit WEP	Select 128-Bit WEP to use 128-bit key length WEP encryption. WEP keys are manually entered in the edit boxes. Only the required number of edit boxes for a key length is displayed (26 Hex digit value for 128-bit keys). Use the Key Index drop-down list to configure the four WEP keys. The adapter uses the selected key. Note: The default Hex digit keys are visible any time they are used. As a security precaution after setting the key values for the network, the digits are replaced with asterisks * in the encryption key fields. If the associated AP uses an optional passkey, the active adapter WLAN profile must use one as well. The passkey is a plain text representation of the WEP keys displayed in the encryption dialog box. The passkey provides an easy way to enter WEP key data without having to remember the entire 128-bit (26 character) Hex digit string.
TKIP	Select this option to use Wireless Protected Access (WPA) via TKIP. Manually enter the shared keys in the passkey field. Tap Next to display the passkey dialog box. Enter an 8 to 63 character string.
AES (Fusion 2.5 only)	Select this option to use Advanced Encryption Standard (AES). Manually enter the shared keys in the passkey field. Tap Next to display the passkey dialog box. Enter an 8 to 63 character string.

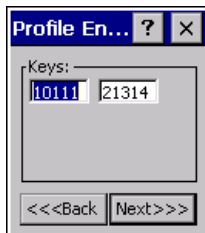
Table 4-12 Encryption / Authentication Matrix

Authentication	Encryption			
	Open	WEP	TKIP	AES (Fusion 2.5 only)
None	Yes	Yes	Yes	Yes
EAP TLS	No	Yes	Yes	Yes
PEAP	No	Yes	Yes	Yes
LEAP	No	Yes	Yes	Yes
TTLS	No	Yes	Yes	Yes

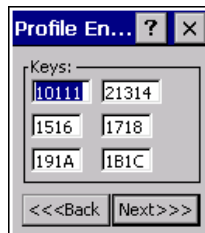
Key Entry Page

If you select either **40-Bit WEP** or **128-Bit WEP** the wizard proceeds to the key entry dialog box unless the **Use Passkey** check box was selected in the **Encryption** dialog box (see [Figure 4-22 on page 4-16](#)). The **Key Entry** dialog box will be shown only if the authentication is set to **None**. To enter the key information:

1. Enter the 40-bit or 128-bit keys into the fields.
2. Tap **Next**.



40-Bit WEP Keys Dialog Box



128-Bit WEP Keys Dialog Box

Figure 4-23 40-Bit and 128-Bit WEP Keys Dialog Boxes

Passkey Dialog

When you select **None** as an authentication and **WEP** as an encryption, you can choose to enter a passkey by checking the **Use PassKey** check box. The user is prompted to enter the passkey. For WEP, the **Use PassKey** checkbox is only available if the authentication is **None**.

When you select **None** as an authentication and **TKIP** as an encryption, you must enter a passkey. The user cannot enter a passkey if the encryption is **TKIP** and the authentication is anything other than **None**.

When you select **None** as an authentication and **AES** as an encryption, you must enter a passkey. The user cannot enter a passkey if the encryption is **AES** and the authentication is anything other than **None**.



Figure 4-24 Passkey Dialog Box

Tap **Next**. The **IP Mode** dialog box displays.

IP Mode

Use the **IP Mode** dialog box to configure network address parameters: IP address, subnet, gateway, DNS, and WINS.



Figure 4-25 IP Config Tab (DHCP)

Table 4-13 IP Mode Options

Encryption	Description
DHCP	Select Dynamic Host Configuration Protocol (<i>DHCP</i>) from the IP Mode drop-down list to obtain a leased IP address and network configuration information from a remote server. DHCP is the default setting for the vehicle computer profile. When DHCP is selected, the IP address fields are read-only.
Static	Select Static to manually assign the IP, subnet mask, default gateway, DNS, and WINS addresses the vehicle computer profile uses.

Select either **DHCP** or **Static** from the drop-down list and tap **Next**. Selecting **Static IP** displays the **IP Address Entry** dialog box. Selecting **DHCP** displays the **Transmit Power** dialog box.

IP Address Entry

Use the **IP Address Entry** dialog box to enter the IP address and subnet information.

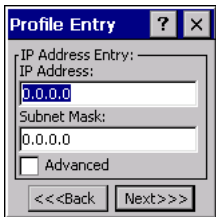


Figure 4-26 Static IP Address Entry Dialog Box

Table 4-14 Static IP Address Entry Fields

Field	Description
IP Address	The Internet is a collection of networks with users that communicate with each other. Each communication carries the address of the source and destination networks and the particular machine within the network associated with the user or host computer at each end. This address is called the IP address (Internet Protocol address). Each node on the IP network must be assigned a unique IP address that is made up of a network identifier and a host identifier. Enter the IP address as a dotted-decimal notation with the decimal value of each octet separated by a period, for example, 192.168.7.27.
Subnet Mask	Most TCP/IP networks use subnets to manage routed IP addresses. Dividing an organization's network into subnets allows it to connect to the Internet with a single shared network address, for example, 255.255.255.0.

Select the **Advanced** check box, then tap **NEXT** to display the **Advanced Address Entry** dialog box. Enter the Gateway, DNS, and WINS address. Tap **NEXT** without selecting the **Advanced** check box to display the **Transmit Power** dialog box.

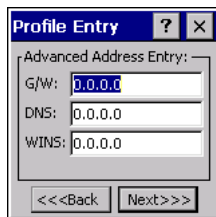


Figure 4-27 Advanced Address Entry Dialog Box

The IP information entered in the profile is only used if you selected the **Enable IP Mgmt** check box in the **Options > System Options** dialog box ([System Options on page 4-35](#)). If you didn't select this, the IP information in the profile is ignored and the IP information entered in the Microsoft interface applies.

Table 4-15 IP Config Advanced Address Entry Fields

Field	Description
G/W	The default gateway forwards IP packets to and from a remote destination.
DNS	The Domain Name System (DNS) is a distributed Internet directory service. DNS translates domain names and IP addresses, and controls Internet email delivery. Most Internet services require DNS to operate properly. If DNS is not configured, Web sites cannot be located and/or email delivery fails.
WINS	WINS is a Microsoft® Net BIOS name server. WINS eliminates the broadcasts needed to resolve computer names to IP addresses by providing a cache or database of translations.

Tap **Next**. The **Transmit Power** dialog box displays.

Transmit Power

The **Transmit Power** drop-down list contains different options for Ad-Hoc and Infrastructure mode. Automatic (i.e., use the current AP settings) and Power Plus (use higher than the current AP settings) are available for **Infrastructure** mode.

Adjusting the radio transmission power level enables the user to expand or confine the transmission area with respect to other wireless devices that could be operating nearby. Reducing coverage in high traffic areas improves transmission quality by reducing the amount of interference in that coverage area.

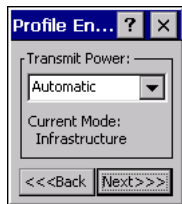


Figure 4-28 Transmit Power Dialog Box (Infrastructure Mode)

Table 4-16 Transmit Power Dialog Box (Infrastructure Mode)

Field	Description
Automatic	Select Automatic (the default) to use the AP power level.
Power Plus	Select Power Plus to set the vehicle computer transmission power one level higher than the level set for the AP.

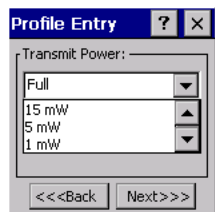


Figure 4-29 Transmit Power Dialog Box (Ad-Hoc Mode)

Table 4-17 Power Transmit Options (Ad-Hoc Mode)

Field	Description
Full	Select Full power for the highest transmission power level. Select Full 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.
30 mW	Select 30 mW to set the transmit power level to 30 mW.
15 mW	Select 15 mW to set the transmit power level to 15 mW.
5 mW	Select 5 mW to set the transmit power level to 5 mW.
1 mW	Select 1 mW for the lowest transmission power level. Use this level when communicating with other devices in very close proximity, or in instances where you expect little or no radio interference from other devices.

Tap **Next** to display the **Battery Usage** dialog box.

Battery Usage

Use the **Battery Usage** dialog box to select power consumption of the wireless LAN. There are three settings available: CAM, Fast Power Save, and MAX Power Save. Battery usage cannot be configured in Ad-Hoc profiles.

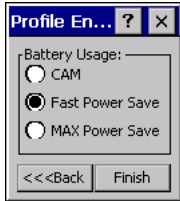


Figure 4-30 Battery Usage Dialog Box



NOTE Power consumption is also related to the transmit power settings.

Table 4-18 Battery Usage Options

Field	Description
CAM	Continuous Aware Mode (CAM) provides the best network performance, but yields the shortest battery life.
Fast Power Save	<i>Fast Power Save</i> (the default) performs in the middle of CAM and MAX Power Save with respect to network performance and battery life.
MAX Power Save	<i>Max Power Save</i> yields the longest battery life while potentially reducing network performance. In networks with minimal latency, Max Power Save performs as well as Fast Power Save, but with increased battery conservation.

Manage Profiles Application

The **Manage Profiles** window provides a list of user-configured wireless profiles. Define up to 32 profiles at any one time. To open the **Manage Profiles** window, tap the **Signal Strength** icon > **Manage Profiles**.

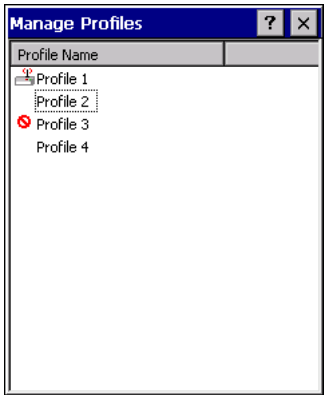


Figure 4-31 *Manage Profiles Window*

Icons next to each profile identify the profile’s current state.

Table 4-19 Profile Icons

Icon	Description
No Icon	Profile is not selected, but enabled.
	Profile is disabled.
	Profile is cancelled. A cancelled profile is disabled until a connect or login function is performed through the configuration editor.
	Profile is in use and describes an infrastructure profile not using encryption.
	Profile is in use and describes an infrastructure profile using encryption.
	Profile is in use and describes an ad-hoc profile not using encryption.
	Profile is in use and describes an ad-hoc profile using encryption.
	Profile is not valid in the device current operating regulatory domain.

The profiles are listed in priority order for use by the automatic roaming feature. Change the order by moving profiles up or down. To edit existing profiles, tap and hold one in the list and select an option from the menu to connect, edit, disable (enable), or delete the profile. (Note that the **Disable** menu item changes to **Enable** if the profile is already disabled.)

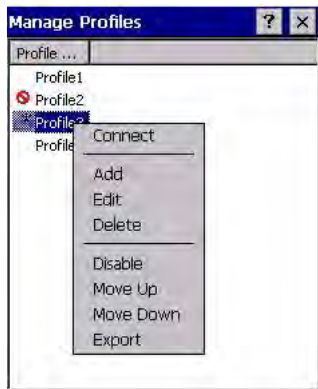


Figure 4-32 *Manage Profiles Context Menu*

Changing Profiles

A completed profile is a set of configuration settings that can be used in different locations to connect to a wireless network. Create different profiles to have pre-defined operating parameters available for use in various network environments. When the **WLAN Profiles** window displays, existing profiles appear in the list.



Figure 4-33 *Manage Profiles*

Tap and hold a profile and select **Connect** from the pop-up menu to set this as the active profile. Once selected, the vehicle computer uses the authentication, encryption, ESSID, IP Config, and power consumption settings configured for that profile.

Editing a Profile

Tap and hold a profile and select **Edit** from the pop-up menu to display the **Profile Wizard** where you can set the ESSID and operating mode for the profile. Use the **Profile Wizard** to edit the profile power consumption and security parameters. See [Profile Editor Wizard on page 4-5](#).

Creating a New Profile

To create new profiles from the **Manage Profiles** window, tap-and-hold anywhere in this window.



Figure 4-34 Manage Profiles - Add

Select **Add** to display the **Profile Wizard** wherein you can set the profile name and ESSID. Set security, network address information, and power consumption level for the new profile.

Deleting a Profile

To delete a profile from the list, tap and hold and select **Delete** from the pop-up menu. A confirmation dialog box appears.

Ordering Profiles

Tap and hold a profile from the list and select **Move Up** or **Move Down** to order the profile. If the current profile association is lost, the vehicle computer attempts to associate with the first profile in the list, then the next, until it achieves a new association.

✓ **NOTE** Profile Roaming must be enabled.

Export a Profile

To export a profile to a registry file, tap and hold a profile from the list and select **Export** from the pop-up menu. The **Save As** dialog box displays with the **Application** folder and a default name of `WCS_PROFILE{profile GUID}.reg` (Globally Unique Identifier).

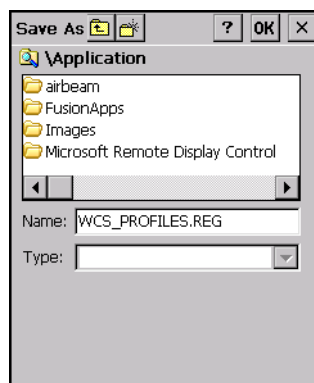


Figure 4-35 Save As Dialog Box

If required, change the name in the **Name** field and tap **Save**. A confirmation dialog box appears after the export completes.

Wireless Status Application

To open the **Wireless Status** window, tap the **Signal Strength** icon > **Wireless Status**. The **Wireless Status** window displays information about the wireless connection.



Figure 4-36 *Wireless Status Window*

The *Wireless Status* window contains the following options. Tap the option to display the option window.

- **Signal Strength** - provides information about the connection status of the current wireless profile.
- **Current Profile** - displays basic information about the current profile and connection settings.
- **IPv4 Status** - displays the current IP address, subnet, and other IP related information assigned to the vehicle computer.
- **Wireless Log** - displays a log of important recent activity, such as authentication, association, and DHCP renewal completion, in time order.
- **Versions** - displays software, firmware, and hardware version numbers.
- **Quit** - exits the **Wireless Status** window.

Option windows contain a back button  to return to the main **Wireless Status** window.

Signal Strength Window

The **Signal Strength** window provides information about the connection status of the current wireless profile including signal quality, missed beacons, and transmit retry statistics. The BSSID address (shown as **AP MAC Address**) displays the AP currently associated with the connection. In Ad-Hoc mode, the AP MAC Address shows the BSSID of the Ad-Hoc network. Information in this window updates every 2 seconds.

To open the **Signal Status** window, tap **Signal Strength** in the **Wireless Status** window.

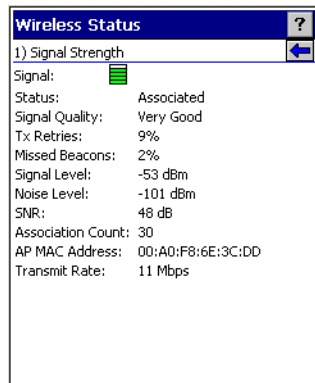


Figure 4-37 Signal Strength Window

After viewing the **Signal Strength** window, tap the back button to return to the **Wireless Status** window.

Table 4-20 Signal Strength Status

Field	Description
Signal	Displays the Relative Signal Strength Indicator (RSSI) of the signal transmitted between the AP and vehicle computer. As long as the Signal Quality icon is green the AP association is not jeopardized. If the icon is red (poor signal), an association with a different AP could be warranted to improve the signal. The signal strength icon changes depending on the signal strength.  Excellent Signal Very Good Signal Good Signal Fair Signal Poor Signal Out of Range (no signal) The radio card is off or there is a problem communicating with the radio card.
Status	Indicates if the vehicle computer is associated with the AP.
Signal Quality	Displays a text format of the Signal icon.
Tx Retries	Displays a percentage of the number of data packets the vehicle computer retransmits. The fewer transmit retries, the more efficient the wireless network is.
Missed Beacons	Displays a percentage of the amount of beacons the vehicle computer missed. The fewer transmit retries, the more efficient the wireless network is. Beacons are uniform system packets broadcast by the AP to keep the network synchronized.
Signal Level	The AP signal level in decibels per milliwatt (dBm).
Noise Level	The background interference (noise) level in decibels per milliwatt (dBm).
SNR	The access point/vehicle computer Signal to Noise Ratio (SNR) of signal strength to noise (interference) in decibels per milliwatt (dBm).
Association Count	Displays the number of APs the vehicle computer connects to while roaming.
AP MAC Address	Displays the MAC address of the AP to which the vehicle computer is connected.
Transmit Rate	Displays the current rate of the data transmission.

Current Profile Window

The **Current Profile** window displays basic information about the current profile and connection settings. This window updates every two seconds.

To open the **Current Profile** window, tap **Current Profile** in the **Wireless Status** window.

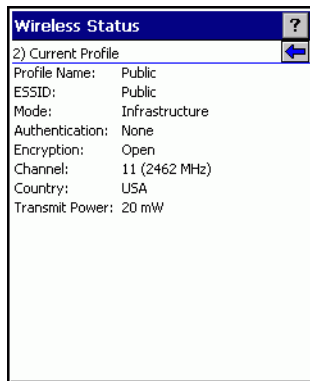


Figure 4-38 Current Profile Window

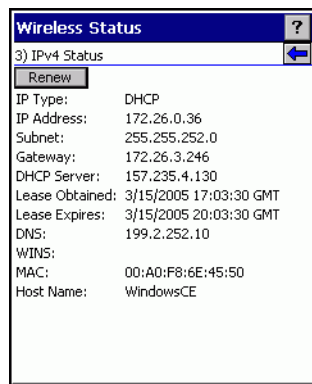
Table 4-21 Current Profile Window

Field	Description
Profile Name	Displays the current profile name the vehicle computer uses to communicate with the AP.
ESSID	Displays the current profile ESSID name.
Mode	Displays the current profile mode, either Infrastructure or Ad-Hoc.
Authentication	Displays the current profile's authentication type.
Encryption	Displays the current profile's encryption type.
Channel	Displays the current profile's channel setting.
Country	Displays the current profile's country setting.
Transmit Power	Displays the radio transmission power level.

IPv4 Status Window

The **IPv4 Status** window displays the current IP address, subnet, and other IP related information assigned to the vehicle computer. It also allows renewing the address if the profile is using DHCP to obtain the IP information. Tap **Renew** to initiate a full DHCP discover. The **IPv4 Status** window updates automatically when the IP address changes.

To open the **IPv4 Status** window, tap **IPv4 Status** in the **Wireless Status** window.

**Figure 4-39** IPv4 Status Window**Table 4-22** IPv4 Status Fields

Field	Description
IP Type	Displays the IP type for the current profile: DHCP or Static . If the IP type is DHCP, leased IP address and network address data appear for the vehicle computer. If the IP type is Static, the values displayed were input manually in the IP Config tab. See IP Mode on page 4-18 .
IP Address	Displays the vehicle computer's IP address. The Internet is a collection of networks with users that communicate with each other. Each communication carries the address of the source and destination networks and the particular machine within the network associated with the user or host computer at each end. This address is called the IP address. Each node on the IP network must be assigned a unique IP address that is made up of a network identifier and a host identifier. The IP address as a dotted-decimal notation with the decimal value of each octet separated by a period, for example, 192.168.7.27.
Subnet	Displays the subnet address. Most TCP/IP networks use subnets to manage routed IP addresses. Dividing an organization's network into subnets allows it to connect to the Internet with a single shared network address, for example, 255.255.255.0.
Gateway	Displays the gateway address. A gateway forwards IP packets to and from a remote destination.
DCHP Server	The Domain Name System (DNS) is a distributed Internet directory service. DNS translates domain names and IP addresses, and controls Internet e-mail delivery. Most Internet services require DNS to operate properly. If DNS is not configured, Web sites cannot be located or e-mail delivery fails.
Lease Obtained	Displays the date that the IP address was obtained.
Lease Expires	Displays the date that the IP address expires and a new IP address is requested.
DNS	Displays the IP address of the DNS server.
WINS	WINS is a Microsoft Net BIOS name server. WINS eliminates the broadcasts needed to resolve computer names to IP addresses by providing a cache or database of translations.
MAC	An IEEE 48-bit address is assigned to the vehicle computer at the factory to uniquely identify the adapter at the physical layer.
Host Name	Displays the name of the vehicle computer.

Wireless Log Window

The **Wireless Log** window displays a log of recent activity, such as authentication, association, and DHCP renewal completion, in time order. Save the log to a file or clear the log (within this instance of the application only). The auto-scroll feature automatically scrolls down when new items are added to the log.

To open the **Wireless Log** window, tap **Wireless Log** in the **Wireless Status** window. The **Wireless Log** window displays.

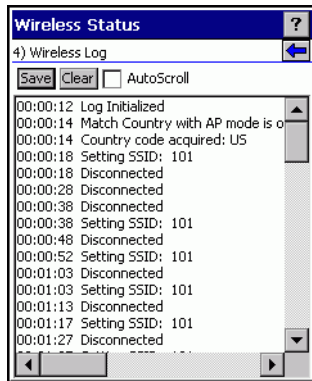


Figure 4-40 Wireless Log Window

Saving a Log

To save a Wireless Log:

1. Tap the **Save** button. The **Save As** dialog box displays.
2. Navigate to the desired folder.
3. In the **Name** field, enter a file name and then tap **OK**. A text file is saved in the selected folder.

Clearing the Log

To clear the log, tap **Clear**.

Versions Window

The **Versions** window displays software, firmware, and hardware version numbers. This window only updates when it is displayed. There is no need to update constantly. The content of the window is determined at runtime, along with the actual hardware and software to display in the list. Executable paths of the software components on the list are defined in registry, so that the application can retrieve version information from the executable. "File not found" appears if the executable cannot be found at the specified path.

To open the **Versions** window, tap **Versions** in the **Wireless Status** window.

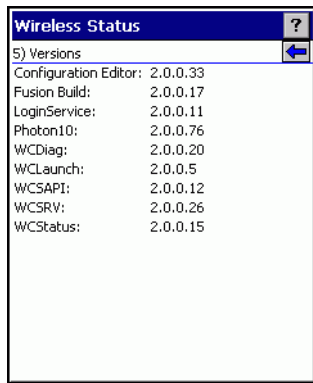


Figure 4-41 Versions Window

The window displays software version numbers for the following:

- Configuration Editor (Fusion 2.0 only)
- Fusion Build
- LoginService
- PublicAPI (Fusion 2.5 and above)
- Photon10
- WCConfigED
- WCDiag
- WCLaunch
- WCSAPI
- WCSRVR
- WCStatus.

Wireless Diagnostics Application

The **Wireless Diagnostics** application window provides links to perform ICMP Ping, Trace Routing, and Known APs. To open the **Wireless Diagnostics** window, tap the **Signal Strength** icon > **Wireless Diagnostics**.

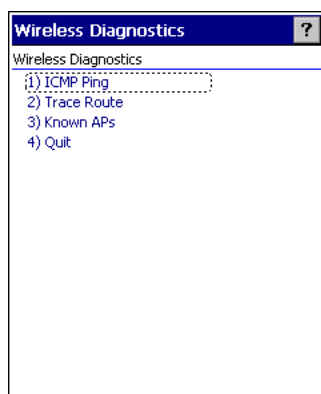


Figure 4-42 Wireless Diagnostics Window

The **Wireless Diagnostics** window contains the following options. Tap the option to display the option window.

- ICMP Ping - tests the wireless network connection.
- Trace Route - tests a connection at the network layer between the vehicle computer and any place on the network.
- Known APs - displays the APs in range using the same ESSID as the vehicle computer.
- Quit - Exits the **Wireless Diagnostics** window.

Option windows contain a back button  to return to the **Wireless Diagnostics** window.

ICMP Ping Window

The **ICMP Ping** window allows testing a connection at the network layer (part of the IP protocol) between the vehicle computer and an AP. Ping tests only stop when you tap the **Stop Test** button, close the **Wireless Diagnostics** application, or if the vehicle computer switches between infrastructure and ad-hoc modes.

To open the **ICMP Ping** window, tap the **ICMP Ping** in the **Wireless Diagnostics** window.

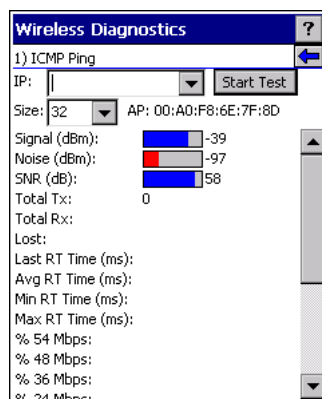


Figure 4-43 ICMP Ping Window

To perform an ICMP ping:

1. In the **IP** field, enter an IP address or select an IP address from the drop-down list.
2. From the **Size** drop-down list, select a size value.
3. Tap **Start Test**. The ICMP Ping test starts. Information of the ping test displays in the appropriate fields.

Trace Route Window

Trace Route traces a packet from a computer to a host, showing how many hops the packet requires to reach the host and how long each hop takes. The **Trace Route** utility identifies where the longest delays occur.

The **Trace Route** window allows testing a connection at the network layer (part of the IP protocol) between the vehicle computer and any place on the network.

To open the **Trace Route** window, tap **Trace Route** in the **Wireless Diagnostics** window.

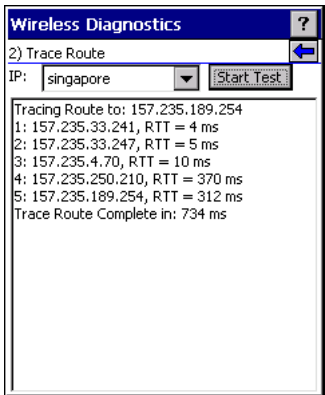


Figure 4-44 Trace Route Window

Enter an IP address or a DNS Name in the IP combo box, and tap **Start Test**. The IP combo box should match the information shown in the **ICMP Ping** window's IP combo box. When starting a test, the trace route attempts to find all routers between the vehicle computer and the destination. The Round Trip Time (RTT) between the vehicle computer and each router appears, along with the total test time. The total test time may be longer than all RTTs added together because it does not only include time on the network.

Known APs Window

The **Known APs** window displays the APs in range using the same ESSID as the vehicle computer. This window is only available in **Infrastructure** mode. To open the **Known APs** window, tap **Known APs** in the **Wireless Diagnostics** window.

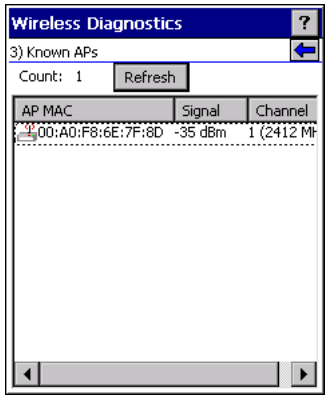


Figure 4-45 Known APs Window

See [Table 4-23](#) for the definitions of the icons next to the AP.

Table 4-23 Current Profile Window

Icon	Description
	The AP is the associated access point, and is set to mandatory.
	The AP is the associated access point, but is not set to mandatory.
	The vehicle computer is not associated to this AP, but the AP is set as mandatory.
	The vehicle computer is not associated to this AP, and AP is not set as mandatory.

Tap and hold on an AP to display a pop-up menu with the following options: **Set Mandatory** and **Set Roaming**.

Select **Set Mandatory** to prohibit the vehicle computer from associating with a different AP. The letter **M** displays on top of the icon. The vehicle computer connects to the selected AP and never roams until:

- You select **Set Roaming**
- The vehicle computer roams to a new profile
- The vehicle computer suspends
- The vehicle computer resets (warm or cold).

Select **Set Roaming** to allow the vehicle computer to roam to any AP with a better signal. These settings are temporary and never saved to the registry.

Tap **Refresh** to update the list of the APs with the same ESSID. The highest signal strength value is 32.

Options

Use the wireless **Option** dialog box to select one of the following operation options from the drop-down list:

- Operating Mode Filtering
- Regulatory
- Band Selection
- System Options
- Change Password
- Export.

Operating Mode Filtering

The **Operating Mode Filtering** options cause the Find WLANs application to filter the available networks found.

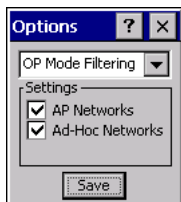


Figure 4-46 *OP Mode Filtering Dialog Box*

The **AP Networks** and **Ad-Hoc Networks** check boxes are selected by default.

Table 4-24 OP Mode Filtering Options

Field	Description
AP Networks	Select the AP Networks check box to display available AP networks and their signal strength within the Available WLAN Networks (see Find WLANs Application on page 4-4). These are the APs available to the vehicle computer profile for association. If this option was previously disabled, refresh the Available WLAN Networks window to display the AP networks available to the vehicle computer.
AD-Hoc Networks	Select the Ad-Hoc Networks check box to display available peer (adapter) networks and their signal strength within the Available WLAN Networks . These are peer networks available to the vehicle computer profile for association. If this option was previously disabled, refresh the Available WLAN Networks window to display the Ad Hoc networks available to the vehicle computer.

Tap **Save** to save the settings or tap **X** to discard any changes.

Regulatory Options

Use the **Regulatory** settings to configure the country the vehicle computer is in. Due to regulatory requirements (within a country) a vehicle computer is only allowed to use certain channels.



Figure 4-47 Regulatory Options Dialog Box

Table 4-25 Regulatory Options

Field	Description
Settings	Select the country from the drop-down list. To connect to a profile, the profile country must match this setting, or the AP country setting if you selected the Enable 802.11d check box.
Enable 802.11d	The WLAN adapter attempts to retrieve the country from APs. Profiles which use Infrastructure mode can only connect if the country set is the same as the AP country settings or if the profile country setting is Allow Any Country . All APs must be configured to transmit the country information.

Band Selection

The **Band Selection** settings identify the frequency bands to scan when finding WLANs. These values refer to the 802.11 standard networks.



Figure 4-48 Band Selection Dialog Box

Table 4-26 Band Selection Options

Field	Description
2.4GHz Band	The Find WLANs application list includes all networks found in the 24 GHz band (802.11b and 802.11g).
5GHz Band	The Find WLANs application list includes all networks found in the 5 GHz band (802.11a and 802.11n).

Tap **Save** to save the settings or tap **X** to discard any changes.

System Options

Use **System Options** to set miscellaneous system setting.

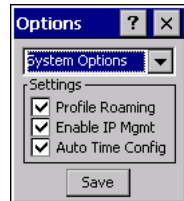


Figure 4-49 System Options Dialog Box

Table 4-27 System Options

Field	Description
Profile Roaming	Configures the vehicle computer to roam to the next available WLAN profile when it moves out of range of the current WLAN profile.
Enable IP Mgmt	Enables the Wireless Companion Services to handle IP address management. The Wireless Companion Service configures the IP based on what is configured in the network profile. Deselect this to manually configure the IP in the standard Windows IP window. Enabled by default.
Auto Time Config	Enables automatic update of the system time. Network association updates the device time based on the time set in the AP. This proprietary feature is only supported with Symbol infrastructure. Enabled by default.

Change Password

Use **Change Password** to require a password before editing a profile. This allows pre-configuring profiles and prevents users from changing the network settings. The user can use this feature to protect settings from a guest user. By default, the password is not set.



Figure 4-50 *Change Password Window*

To create a password for the first time, leave the **Current:** text box empty and enter the new password in the **New:** and **Confirm:** text boxes. Tap **Save**.

To change an existing password, enter the current password in the **Current:** text box and enter the new password in the **New:** and **Confirm:** text boxes. Tap **Save**.

To delete the password, enter the current password in the **Current:** text box and leave the **New:** and **Confirm:** text boxes empty. Tap **Save**.

✓ **NOTE** Passwords are case sensitive and can not exceed 160 characters.

Export

Use **Export** to export all profiles to a registry file, and to export the options to a registry file.

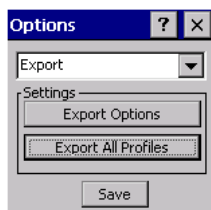


Figure 4-51 *Options - Export Dialog Box*

To export options:

1. Tap **Export Options**. The **Save As** dialog box displays.

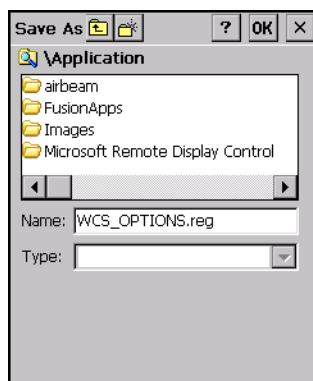


Figure 4-52 *Export Options Save As Dialog Box*

2. Enter a filename in the **Name:** field. The default filename is **WCS_OPTIONS.REG**.

3. Tap **Save**.

To export all profiles:

1. Tap **Export All Profiles**. The **Save As** dialog box displays.

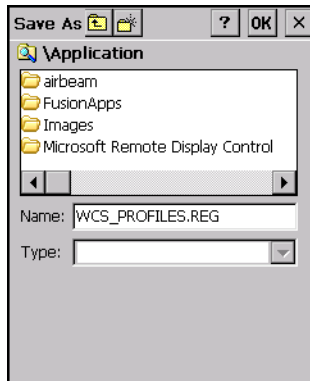


Figure 4-53 *Export All Profiles Save As Dialog Box*

2. Enter a filename in the **Name:** field. The default filename is *WCS_PROFILES.REG*.

3. In the **Folder:** drop-down list, select the desired folder.

4. Tap **Save**.

Selecting **Export All Profiles** saves the current profile. This information is used to determine which profile to connect with after a warm boot or cold boot.

Cold Boot Persistence

Export options and profiles to provide cold boot persistence. Save the exported registry files in the *Application* folder to use them on a cold boot and restore previous profile and option settings.

Currently, only server certificates can be saved for cold boot persistence. To save server certificates for cold boot persistence, save the certificate files in the folder (*Application/Certs* on Fusion 2.0 or *Application* on Fusion 2.5 and above) to install the certificates automatically on a cold boot.



NOTE User certificates cannot be saved for cold boot persistence at this time.

Registry Settings

Use a registry key to modify some of the parameters. The registry path is:

HKLM\SOFTWARE\Symbol Technologies, Inc.\Configuration Editor

Table 4-28 Registry Parameter Settings

Key	Type	Default	Description												
CertificateDirectory	REG_SZ	\\Application	The default directory to find certificates.												
EncryptionMask	REG_DWORD	0x0000001F	Defines the supported encryption types. This is a bitwise mask with each bit corresponding to an encryption type. 1 = Type is supported 0 = Type is not supported <table><tr><th>Bit Number</th><th>Encryption Type</th></tr><tr><td>0</td><td>None</td></tr><tr><td>1</td><td>40-Bit WEP</td></tr><tr><td>2</td><td>128-Bit WEP</td></tr><tr><td>3</td><td>TKIP</td></tr><tr><td>4</td><td>AES (Fusion 2.5 and above only)</td></tr></table>	Bit Number	Encryption Type	0	None	1	40-Bit WEP	2	128-Bit WEP	3	TKIP	4	AES (Fusion 2.5 and above only)
Bit Number	Encryption Type														
0	None														
1	40-Bit WEP														
2	128-Bit WEP														
3	TKIP														
4	AES (Fusion 2.5 and above only)														

Log On/Off Application

When the user launches the **Log On/Off** application, the vehicle computer may be in two states; the user may be logged onto the vehicle computer by already entering credentials through the login box, or there are no user logged on. Each of these states have a separate set of use cases and a different look to the dialog box.

User Already Logged In

If already logged into the vehicle computer, the user can launch the login dialog box for the following reasons:

- Connect to and re-enable a cancelled profile. To do this:
 - Launch the Log On/Off dialog.
 - Select the cancelled profile from the profile list.
 - Login to the profile.

✓ **NOTE** Re-enable cancelled profiles using the Profile Editor Wizard and choosing to connect to the cancelled profile. Cancelled profiles are also re-enabled when a new user logs on.

- Log off the vehicle computer to prevent another user from accessing the current users network privileges.
- Switch vehicle computer users to quickly logoff the vehicle computer and allow another user to log into the vehicle computer.

No User Logged In

If no user is logged into the vehicle computer, launch the login dialog box and log in to access user profiles.

The **Login** dialog box varies if it is:

- Launched by Wireless Application, because the service is connecting to a new profile that needs credentials.

- Launched by Wireless Application, because the service is trying to verify the credentials due to credential caching rules.
- Launched by a user, when a user is logged in.
- Launched by a user, when no user is logged in.

Table 4-29 Log On/Off Options

Field	Description
Wireless Profile Field	When launching the login application, the Wireless Profile field has available all the wireless profiles that require credentials. This includes profiles that use EAP TLS, PEAP, LEAP, and EAP-TTLS.
Profile Status Icon	The profile status icon (next to the profile name) shows one of the following states: The selected profile is cancelled. The selected profile is enabled but is not the current profile. The profile is the current profile (always the case for when the Wireless Application is launched).
Network Username and Password Fields	The Network Username and Network Password fields are used as credentials for the profile selected in the Wireless Profile field. Currently these fields are limited to 159 characters.
Mask Password Checkbox	The Mask Password checkbox determines whether the password field is masked (i.e., displays only the '*' character) or unmasked (i.e., displays the entered text). Check the box to unmask the password. Uncheck the box to mask the password (the default).
Status Field	The status field displays status that is important to the login dialog. If the user opens the dialog and needs to prompt for credentials for a particular profile at this time, it can use the status field to let the user know that the network is held up by the password dialog being open.

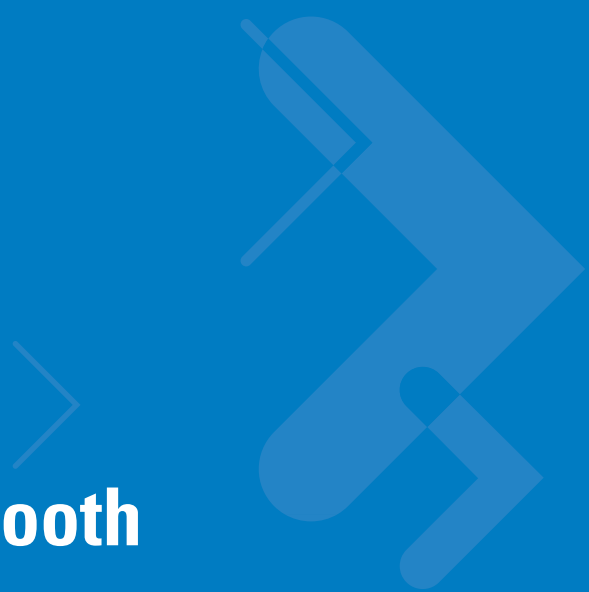
Tapping **OK** sends the credentials through Wireless Application API. If there are no credentials entered, a dialog box displays informing the user which field was not entered.

The **Log Off** button only displays when a user is already logged on. When the **Log Off** button is tapped, the user is prompted with three options: Log Off, Switch Users, and Cancel. Switching users logs off the current user and re-initialize the login dialog box to be displayed for when there is no user logged on. Logging off logs off the current user and close the login dialog box. Tapping **Cancel** closes the Log Off dialog box and the Login dialog box displays.

When the user is logged off, the vehicle computer only roams to profiles that do not require credentials or to profiles that were created with the credentials entered into the profile

The **Cancel** button closes the dialog without logging into the network. If the login dialog was launched by the Wireless Application and not by the user, tapping **Cancel** first causes a message box to display a warning that the cancel disables the current profile. If the user still chooses to cancel the login at this point, the profile is cancelled.

Once a profile is cancelled, the profile is suppressed until a user actively re-enables it or a new user logs onto the vehicle computer.



Chapter 5 Using Bluetooth

Introduction

Bluetooth-equipped devices can communicate wirelessly, using frequency-hopping spread spectrum (FHSS) RF to transmit and receive data in the 2.4 GHz Industry Scientific and Medical (ISM) band (802.15.1). Bluetooth wireless technology is specifically designed for short-range (30 feet/10 meters) communications and low power consumption.

Vehicle computers with Bluetooth capabilities can exchange information (e.g., files and tasks) with other Bluetooth enabled devices such as scanners and printers.

Vehicle computers with Bluetooth technology use the StoneStreet One Bluetooth stack. To program Bluetooth within the vehicle computer refer to the StoneStreet One SDK.

Adaptive Frequency Hopping

Adaptive Frequency Hopping (AFH) is a method of avoiding fixed frequency interferers. AFH can be used with Bluetooth voice. All devices in the piconet (Bluetooth network) must be AFH-capable in order for AFH to work. There is no AFH when connecting and discovering devices. Avoid making Bluetooth connections and discoveries during critical 802.11b communications. AFH for Bluetooth can be broken-down into four main sections:

- Channel Classification - A method of detecting an interference on a channel-by-channel basis, or pre-defined channel mask.
- Link Management - Coordinates and distributes the AFH information to the rest of the Bluetooth network.
- Hop Sequence Modification - Avoids the interference by selectively reducing the number of hopping channels.
- Channel Maintenance - A method for periodically re-evaluating the channels.

When AFH is enabled, the Bluetooth radio “hops-around” (instead of through) the 802.11b high-rate channels. AFH coexistence allows vehicle computers to operate in any infrastructure. AFH is always enabled in the VC70.

The Bluetooth radio in this vehicle computer operates as a Class 2 device power class. The maximum output power is 2.5mW and the expected range is up to 32.8 feet (10 meters). A definitive definition of ranges based on power class is difficult to obtain due to power and device differences, and whether one measures open space or closed office space.

Security

The current Bluetooth specification defines security at the link level. Application-level security is not specified. This allows application developers to define security mechanisms tailored to their specific need. Link-level security is really between devices not users, while application-level security can be implemented on a per-user basis. The Bluetooth specification defines security algorithms and procedures needed to authenticate devices, and if needed, encrypt the data flowing on the link between the devices. Device authentication is a mandatory feature of Bluetooth while link encryption is optional.

Pairing of Bluetooth devices is accomplished by creating an initialization key that is used to authenticate the devices and create a link key for them. Entering a common PIN number in the devices being paired generates the initialization key. The PIN number is never sent over the air. By default, the Bluetooth stack responds with no key when a key is requested (it is up to user to respond to the key request event). Authentication of Bluetooth devices is based-upon a challenge-response transaction. Bluetooth allows for a PIN number or passkey that is used to create other 128-bit keys used for security and encryption. The encryption key is derived from the link key used to authenticate the pairing devices. Also worthy of note is the limited range and fast frequency hopping of the Bluetooth radios that makes long-distance eavesdropping difficult.

It is recommended:

- Perform pairing in a secure environment
- Keep PIN codes private and don't store the PIN codes in the vehicle computer
- Implement application-level security.

Turning the Bluetooth Radio Mode On and Off

Turn off the Bluetooth radio to save power or if entering an area with radio restrictions (e.g., an airplane). When the radio is off, the vehicle computer can not be seen or connected to by other Bluetooth devices. Turn on the Bluetooth radio to exchange information with other Bluetooth devices (within range). Communicate only with Bluetooth radios in close proximity.

✓ **NOTE** The bluetooth radio in the VC70 is On by default.

Disabling Bluetooth

Tap  > **Settings** > **Control Panel** > **MotoBTUI** icon. Click the Bluetooth On button. The  disappears from the system tray.

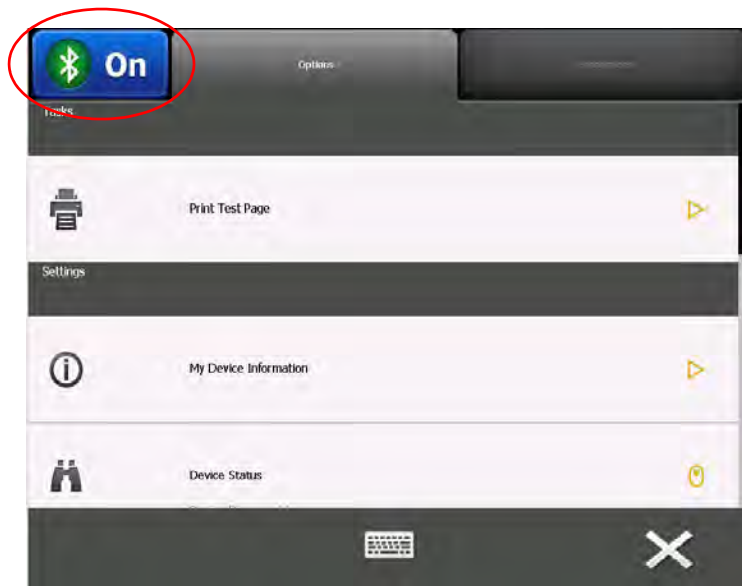


Figure 5-1 *Disable Bluetooth*

Enabling Bluetooth

Tap  > **Settings** > **Control Panel** > **MotoBTUI** icon. Click the Bluetooth Off button. The  appears in the system tray.

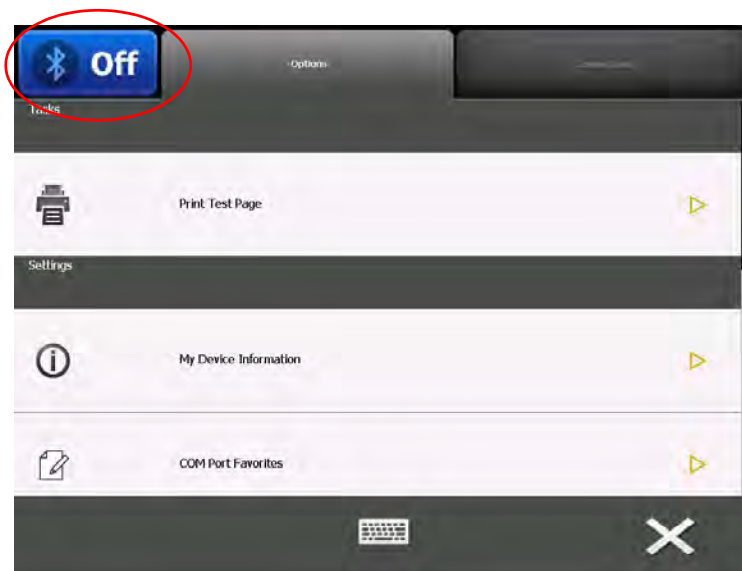


Figure 5-2 *Enable Bluetooth*

Bluetooth Power States

Cold Boot

When a cold boot is performed on the vehicle computer, Bluetooth turns off. It is normal to see the Bluetooth icon appear and disappear, as well as a wait cursor, when initialization proceeds in all modes.

Warm Boot

When a warm boot is performed on the vehicle computer, Bluetooth returns to the disabled state (off).

Suspend

When the vehicle computer suspends, Bluetooth turns off.

✓ **NOTE** When the vehicle computer is placed in suspend mode, the Bluetooth radio mode powers off and the piconet (Bluetooth connection) is dropped. When the vehicle computer resumes, it could take up to 10 seconds for the Bluetooth radio driver to re-initialize the radio.

Resume

When the vehicle computer resumes, Bluetooth turns on if it was on prior to suspend. Note that any Bluetooth connection that was dropped during a suspend needs to be reconnected after a resume.

Pairing Cordless Scanners

The primary purpose of the bluetooth in the VC70 is to enable connection with the available cordless scanners.

To pair your cordless bluetooth scanner, scan the pair label barcode in the upper right of the VC70.

In that case the scanners are the Master and the VC70 is the Slave.

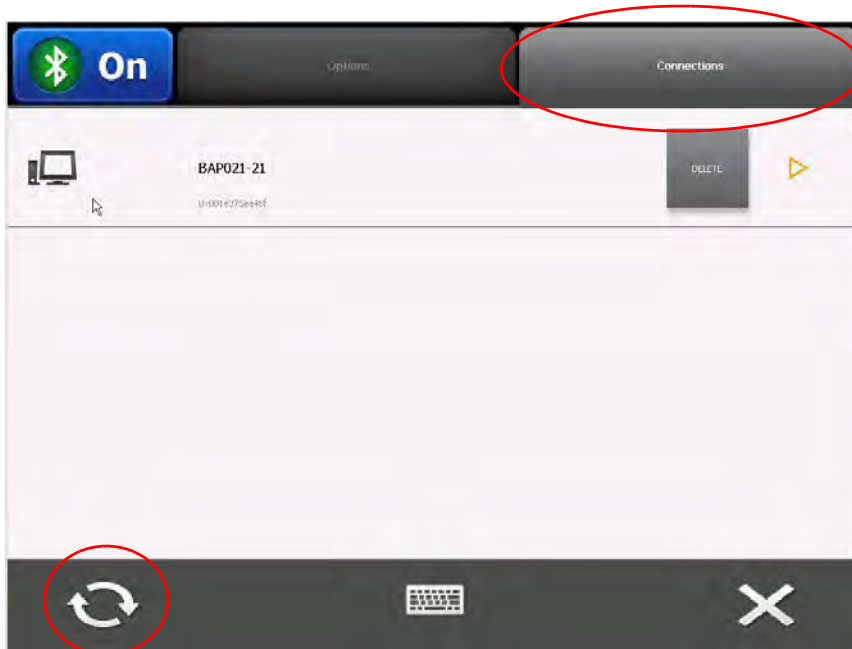
To unpair your cordless bluetooth scanner, scan the unpair label barcode in the upper left of the VC70.

Discovering Bluetooth Device(s)

Follow the steps below to discover Bluetooth devices. The vehicle computer can receive information from discovered devices, without bonding. However, once bonded, an exchange of information between the vehicle computer and a bonded device occurs automatically when the Bluetooth radio is turned on.

To find Bluetooth devices in the area:

1. Ensure that the Bluetooth device being looked for is in discoverable mode.
2. Ensure that the two devices are within 30 feet (10 meters) of one another.
3. Click the **Connections** tab.



4. The application scans for bluetooth devices automatically. A list of discovered bluetooth devices is shown on the screen.
5. To refresh your list, click the refresh button on the lower left side of the screen.

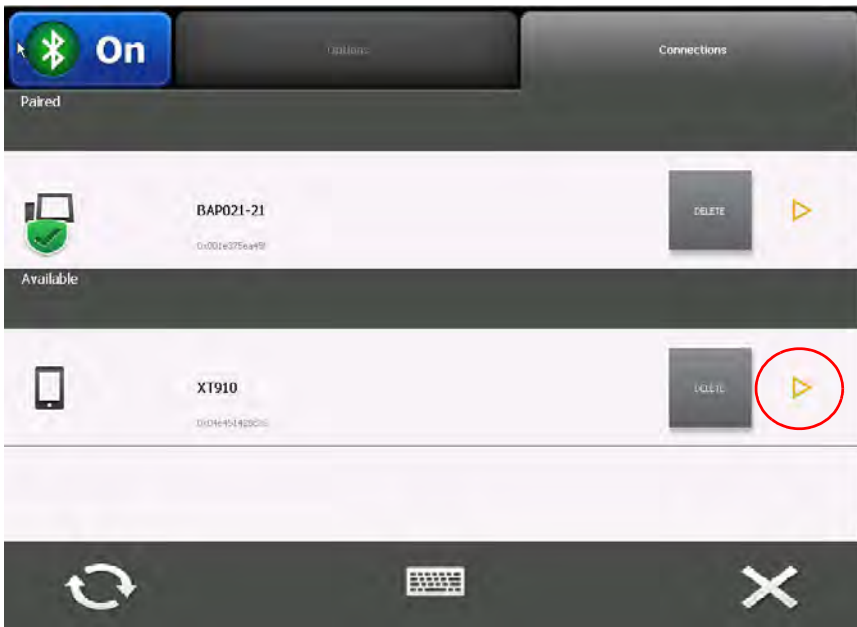
Bonding with Discovered Device(s)

✓ **NOTE** You can bond (pair) a scanner to your vehicle computer by scanning the pair barcode in the upper right side of the VC70. The scanner beeps indicating that it is successfully connected to the VC70.

A bond is a relationship created between the vehicle computer and another Bluetooth device in order to exchange information in a secure manner. Creating a bond involves entering the same PIN on the two devices to bond. Once a bond is created, and the Bluetooth radios are turned on, the devices recognize the bond and are able to exchange information without re-entering a PIN.

To bond with a discovered Bluetooth device:

1. Discover remote devices. See [Discovering Bluetooth Device\(s\) on page 5-4](#).
2. Select the required device from the list and click the > button.



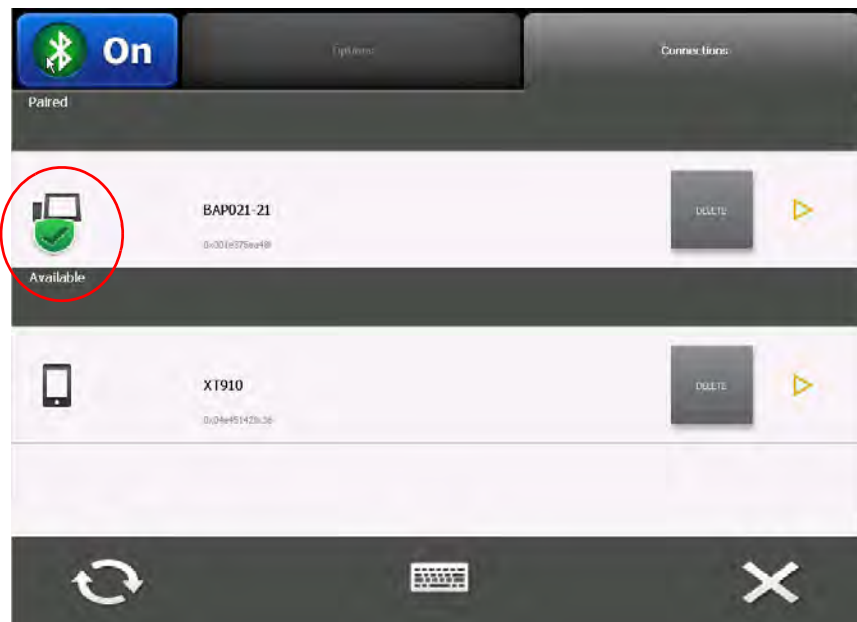
3. The following Pair button appear.



4. Click to pair the discovered device to your computer.



5. If **Pin Code** is required, enter the code (12345). You will be required to enter the same code on your device.
6. Your device appears as available on your screen.

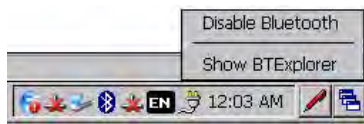


File Transfer Services

- ✓ **NOTE** The following services are available with Stonestreet One stack.
- ✓ **NOTE** Shared folders are a security risk.

To transfer files between the vehicle computer and another Bluetooth enabled device:

1. Ensure the vehicle computer is discoverable and connectable. See [Bluetooth Settings on page 5-12](#).
2. Discover and bond (pair) with the remote access point. See [Bonding with Discovered Device\(s\) on page 5-5](#).
3. To see the **BTE Explorer** tap the  icon. The following menu appear:



4. Click the **Show BTE Explorer**.
5. In **BTE Explorer**, select the **Remote Devices** folder.
6. Select the **Trusted Devices** folder.
7. Tap the remote device folder.
8. Tap and hold on the remote device and select **Explore** from the pop-up menu.
9. Tap and hold on **File Transfer** and select **Connect**. The remote device's accessible folders appear.
10. Select a folder. The contents of the folder appear in the sub-window.

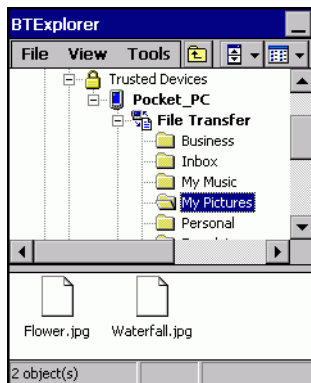


Figure 5-3 Remote Device Folders

11. Tap and hold on the file. A pop-up menu appears.
12. Select the action to perform:
 - a. *New* - create a new file or folder. on the remote device
 - b. *Delete* - delete the selected file on the remote device.
 - c. *Get File* - copy the file from the remote device to the vehicle computer.
 - d. *Put File* - copies a file from the vehicle computer to the remote device.

Create New File or Folder

To create a new folder or file on the remote device:

1. Tap and hold on the file and select **New > Folder** or **New > File**. The **Create New Folder** or **Create New File** window appears.
2. Enter the name for the new folder or file. Tap **OK**.
3. A new folder or file is created on the remote device.

Delete File

To delete a file from the remote device:

1. Tap and hold on the file and select **Delete**.
2. In the **Delete Remote Device File** dialog box tap **OK**.

Get File

To copy a file from a remote device:

1. Tap and hold on the file and select **Get**. The **Save Remote File** window appears.
2. Navigate to the directory to save the file.
3. Tap **Save**. The file is transferred from the remote device to the vehicle computer.

Put File

To copy a file to a remote device:

1. Tap and hold on the file and select **Put**. The **Send Local File** window appears.
2. Navigate to the directory to save the file and select a file.
3. Tap **Open**. The file is transferred from the vehicle computer to the remote device.

Connect to Internet Using Access Point

This section explains how to access a Bluetooth-enabled LAN access point (AP) for a network connection. With this method of communication the Internet Explorer can be used to connect to a server.

1. Ensure the vehicle computer is discoverable and connectable. See [Bluetooth Settings on page 5-12](#).
2. Discover and bond (pair) with the remote access point. See [Bonding with Discovered Device\(s\) on page 5-5](#).
3. In **BTE Explorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.
5. Tap the remote device folder.
6. Tap and hold on the remote device and select **Explore** from the pop-up menu.
7. Tap and hold **LAN Access using PPP** service and select **Connect** from the pop-up menu.
8. The vehicle computer connects with the Access Point.
9. Tap  > **Internet Explorer**. The **Internet Explorer window** appears.
10. In the address field, enter an internet address and tap the **Enter** button. The web page loads.

OBEX Object Push Services

Object Exchange (OBEX) is a set of protocols allowing objects such as Contacts or pictures to be shared using Bluetooth.

To exchange contact information with another Bluetooth enabled device:

1. Ensure the vehicle computer is discoverable and connectable. See [Bluetooth Settings on page 5-12](#).
2. Discover and bond (pair) with the remote device. See [Bonding with Discovered Device\(s\) on page 5-5](#).

3. In **BTExplorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.
5. Tap the remote device folder.
6. Tap and hold on **OBEX Object Push** and select **Connect**. The **OBEX Object Push** window appears.
7. In the **Action** drop-down list, select one of the options: **Send Contact Information**, **Swap Contact Information**, **Fetch Contact Information** or **Send a Picture**.

Send a Picture

To send a picture to another device:

1. Ensure the vehicle computer is discoverable and connectable. See [Bluetooth Settings on page 5-12](#).
2. Discover and bond (pair) with the remote device. See [Bonding with Discovered Device\(s\) on page 5-5](#).
3. In **BTExplorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.
5. Tap the remote device folder.
6. Tap and hold on **OBEX Object Push** and select **Connect**. The **OBEX Object Push** window appears.



Figure 5-4 OBEX Object Push Window

7. In the **Action** drop-down list, select **Send A Picture**.
8. Tap . The **Send Local Picture** window appears.

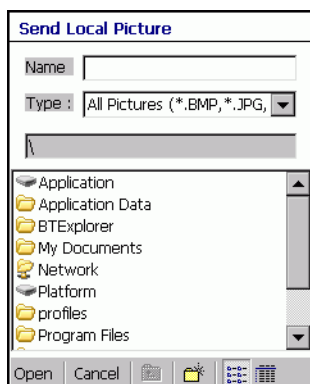


Figure 5-5 Send Local Picture Window

9. Navigate to the picture that you want to send to the other device.
10. Tap **Open**.
11. Tap **OK**. The picture is sent to the other device and a confirmation dialog box appears on the other device to accept the picture. A **Send Picture** dialog appears.
12. Tap **Ok**.

Headset Services

To connect to a Bluetooth headset:

1. Ensure the vehicle computer is discoverable and connectable. See [Bluetooth Settings on page 5-12](#).
2. Discover and bond (pair) with the headset.
3. In **BTE Explorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.
5. Tap the remote device folder.
6. Tap and hold on the remote device and select **Explore**. A headset service item appears.
7. Tap and hold on the headset service name and select **Connect**.
8. The vehicle computer connects to the headset. Refer to your headset user manual for instruction on communicating with a Bluetooth device.



NOTE If the vehicle computer goes into suspend mode, the Bluetooth headset disconnects from the vehicle computer.

To adjust the microphone gain:

1. Tap and hold on the headset service item and select **Adjust Microphone** from the pop-up menu. The **Microphone Properties** window appears.
2. Select the slider and adjust the gain.
3. Tap **OK**.

Serial Port Services



NOTE By default, COM ports COM4, COM5 and COM9 are Bluetooth virtual ports. If an application opens one of these ports, the Bluetooth driver activates and guides you through a Bluetooth connection.

Use the wireless Bluetooth serial port connection just as you would a physical serial cable connection. You must configure the application that will use the connection to the correct serial port.

To establish a serial port connection:

1. Ensure the vehicle computer is discoverable and connectable. See [Bluetooth Settings on page 5-12](#).
2. Discover and bond (pair) with the remote device. See [Bonding with Discovered Device\(s\) on page 5-5](#).
3. In **BTE Explorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.

5. Tap the remote device folder.
6. Tap and hold **Serial Port** and select **Connect** in the pop-up menu. The **Remote Service Connection** window appears.



Figure 5-6 Remote Service Connection Window

7. In the **Local COM Port** drop-down list select a COM port.
8. Tap **OK**.

Personal Area Network Services

Connect two or more Bluetooth devices to share files, collaborate or play multi player games.

To establish a Personal Area Network connection:

1. Ensure the vehicle computer is discoverable and connectable. See [Bluetooth Settings on page 5-12](#).
2. Discover and bond (pair) with the remote device. See [Bonding with Discovered Device\(s\) on page 5-5](#).
3. In **BTE Explorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.
5. Tap the remote device folder.
6. Tap and hold **Personal Area Network** and select **Connect** in the pop-up menu.

Bluetooth Settings

Use the **BTE Explorer Settings** window to configure the operation of the **BTE Explorer** application. Tap **Tools > Settings**. The **BTE Explorer Settings** window appears.

Device Info Tab

Use the **Device Info** tab to configure the vehicle computer's Bluetooth connection modes.



Figure 5-7 BTE Explorer Settings - Device Info Tab

Device Name	Displays the name of the vehicle computer.
Discoverable Mode	Allows you to set the vehicle computer to be discoverable by other Bluetooth devices or not be discoverable. Note: For security reasons, the default is set to Non Discoverable .
Connectable Mode	Allows you to set the vehicle computer to be connectable by other Bluetooth devices or not be connectable. Note: For security reasons, the default is set to Non Connectable .

Services Tab

✓ **NOTE** For security reason, by default services are not enabled.

Use the Services tab to add or delete Bluetooth services.



Figure 5-8 BTE Explorer Settings - Services Tab

To add a service:

1. Tap **Add**. The **Add Local Service** window displays.



Figure 5-9 *Add Local Service Window*

2. In the list, select a service to add.
3. Tap **OK**. The **Edit Local Service** window displays for the selected service.
4. Select the appropriate information and then tap **OK**. See the following paragraphs for detailed information on the available services.

File Transfer Service

File transfer allows files to be browsed by other Bluetooth devices.

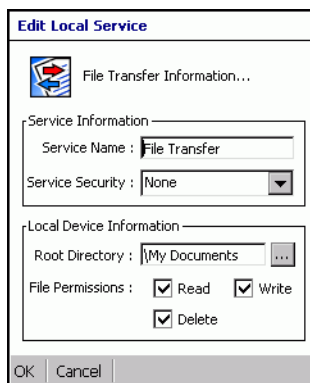


Figure 5-10 *File Transfer Information Window*

Service Name	Displays the name of the service.
Service Security	Select the type of security from the drop-down list; None, Authenticate or Authenticate/Encrypt.
Root Directory	Select the directory that other Bluetooth devices can access.
File Permissions	Select the file permissions for the selected directory. Check the appropriate box to grant Read access, write access and delete access.

OBEX Object Push Service

OBEX Object Push allows contacts, business cards, pictures, appointments, and tasks to be pushed to the device by other Bluetooth devices.



Figure 5-11 OBEX Exchange Information Window

Service Name	Displays the name of the service.
Service Security	Select the type of security from the drop-down list; None , Authenticate or Authenticate/Encrypt .
Business Card	TBD
Do not allow clients to push objects	Disables clients from pushing objects to the vehicle computer.
Inbox Directory	Select a directory where another Bluetooth device can store files.

Personal Area Networking Service

Personal Area Networking hosts a Personal Area Network which allows communication with other Bluetooth devices.

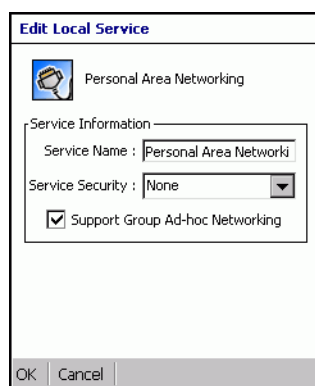


Figure 5-12 Personal Area Networking Window

Service Name	Displays the name of the service.
Service Security	Select the type of security from the drop-down list; None , Authenticate or Authenticate/Encrypt .
Support Group Ad-Hoc Networking	TBD

Serial Port Service

Serial port allows COM ports to be accessed by other Bluetooth devices.

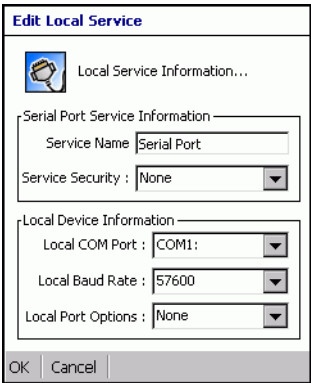


Figure 5-13 Serial Port Service Window

Service Name	Displays the name of the service.
Service Security	Select the type of security from the drop-down list; None , Authenticate or Authenticate/Encrypt .
Local COM Port	Select the COM port. Select COM1 to use a modem or other device that is connected to the connector on the bottom of the vehicle computer.
Local Baud Rate	Select the communication baud rate.
Local Port Options	Select the port option.

Headset Service

Serial port allows COM ports to be accessed by other Bluetooth devices.



Figure 5-14 Headset Service Window

Service Name	Displays the name of the service.
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Security Tab

To adjust the security settings for an individual service, select the **Services** tab first, then select the individual service, then **Properties**.



Figure 5-15 BTE Explorer Settings - Security Tab

Use PIN Code (Incoming Connecting)

Select for automatic use of the PIN code entered in the **PIN Code** text box. It is recommended not to use this automatic PIN code feature. See [Security on page 5-2](#) for more information.

PIN Code

Enter the PIN code.

Encrypt Link On All Outgoing Connections

Select to enable or disable encryption. Use encryption whenever possible.

Discovery Tab

Use the **Discovery** tab to set and modify discovered devices.



Figure 5-16 BTE Explorer Settings - Discovery Tab

Inquiry Length

Sets the amount of time that the vehicle computer takes to discover Bluetooth devices in the area.

Name Discovery Mode

Select either **Automatic** or **manual**.

Discovered Devices

Deletes all discovered devices and link keys.

Virtual COM Port Tab

Use the **Virtual COM Port** tab to select the COM ports for Bluetooth communication.

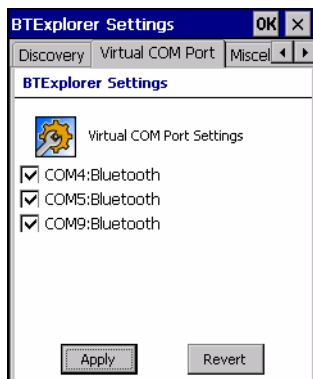


Figure 5-17 BTE Explorer Settings - Virtual COM Port Tab

COM4:Bluetooth	Enable or disable COM Port 4.
COM5:Bluetooth	Enable or disable COM Port 5
COM9:Bluetooth	Enable or disable COM Port 9

✓ **NOTE** If an application uses one of the COM ports assigned to Bluetooth, opening this port causes the Bluetooth stack to activate and guide you through the connection process.



Figure 5-18 COM Port Connection

Miscellaneous Tab



Figure 5-19 BTE Explorer Settings - Miscellaneous Tab

Highlight Connections

Select the connection type to highlight when connected. In the Wizard Mode, the only option is **Favorites** or **None**. In the **Explorer Mode** the options are **None**, **Tree View Only**, **List View Only** or **Tree and List View**.

Apply Text Style

Select the text style to be applied to the connection text.

Apply Text Color

Select the text color to be applied to the connection text.



Chapter 6 ActiveSync

Introduction

To communicate with various host devices, install Microsoft ActiveSync (Version 4.5 or other, compatible with Windows Embedded Compact 7 platform) on the host computer. Use ActiveSync to synchronize information on the vehicle computer with information on the host computer. Changes made on the vehicle computer or host computer appear in both places after synchronization.

ActiveSync software:

- Allows working with vehicle computer-compatible host applications on the host computer. ActiveSync replicates data from the vehicle computer so the host application can view, enter, and modify data on the vehicle computer.
- Synchronizes files between the vehicle computer and host computer, converting the files to the correct format.
- Backs up the data stored on the vehicle computer. Synchronization is a one-step procedure that ensures the data is always safe and up-to-date.
- Copies (rather than synchronizes) files between the vehicle computer and host computer.
- Controls when synchronization occurs by selecting a synchronization mode, e.g., set to synchronize continually while the vehicle computer is connected to the host computer, or set to only synchronize on command.
- Selects the types of information to synchronize and control how much data is synchronized.

Installing ActiveSync

To install ActiveSync on the host computer, download version 4.5 or higher from the Microsoft web site at <http://www.microsoft.com>. Refer to the installation included with the ActiveSync software.

Windows Embedded Compact 7 supports ActiveSync 4.5 on Windows XP. Or, Windows Mobile Device Center on Windows Vista and Windows 7.

Vehicle Computer Setup

✓ **NOTE** Microsoft recommends installing ActiveSync on the host computer before connecting the vehicle computer.

The vehicle computer can be set up to communicate either with a serial connection or a USB connection. Serial connection can be to the vehicle computer COM1 port. USB connection can be made to the vehicle computer Micro USB (Micro USB On the Go) port. [Chapter 2, Installation](#) provides the accessory setup and cable connection information for use with the vehicle computer. The vehicle computer communication settings must be set to match the communication settings used with ActiveSync.

✓ **NOTE** You cannot use a USB scanner plugged into the rugged USB port when you ActiveSync to a host computer using the Micro USB port.

1. On the vehicle computer tap  > **Settings** > **Control Panel** > **PC Connection** icon. The **PC Connection Properties** window appears.

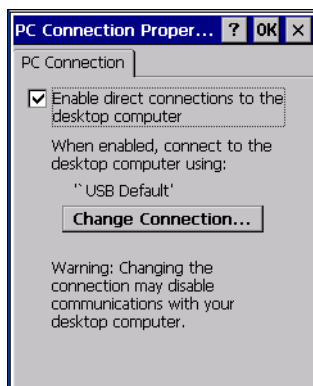


Figure 6-1 PC Connection Properties Window

2. Tap the **Change Connection** button.
3. Select the connection type from the drop-down list (Only USB type connection is enabled).



Figure 6-2 Change Connection Window

4. Tap **OK** to exit the **Change Connection** window and tap **OK** to exit the **PC Connection Properties** window.
5. Proceed with installing ActiveSync on the host computer and setting up a partnership.

Setting Up an ActiveSync Connection on the Host Computer

To start ActiveSync:

1. Select  > **Programs** > **Microsoft ActiveSync** on the host computer. The **ActiveSync** window displays.

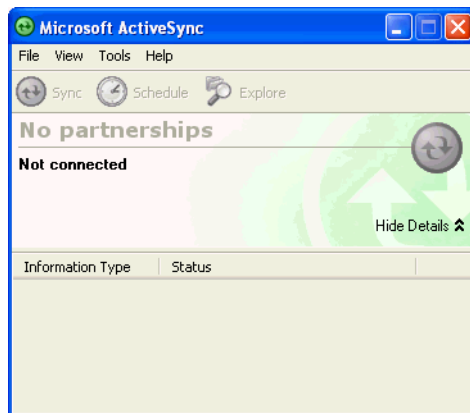


Figure 6-3 ActiveSync Window



NOTE Assign each vehicle computer a unique device name. Do not try to synchronize more than one vehicle computer to the same name.

2. In the **ActiveSync** window, select **File** > **Connection Settings**. The **Connection Settings** window appears.



Figure 6-4 Connection Settings Window

3. Select the appropriate check box for the type of connection used.
4. Select the **Show status icon in Taskbar** check box.
5. Select **OK** to save any changes made.

Setting up a Partnership

To set up a partnership:

1. If the **Get Connected** window does not appear on the host computer, select  > **All Programs** > **Microsoft ActiveSync**.



Figure 6-5 New Partnership Window

2. Click **Cancel** to connect as a guest (normally selected option).
3. Click **Next** to synchronize with host computer.

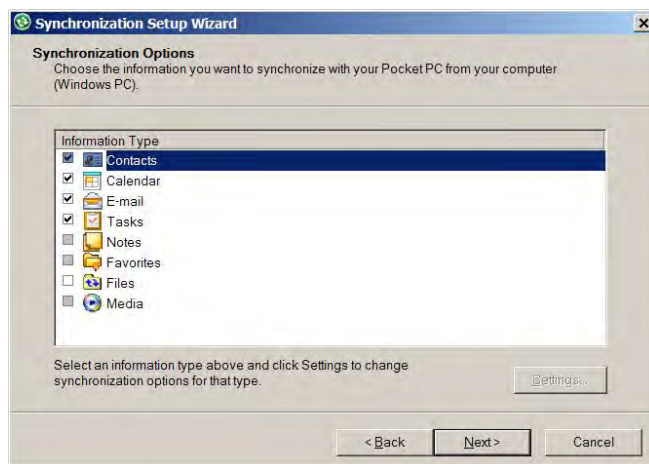


Figure 6-6 Select Synchronization Setting Window

4. Select the appropriate settings and click **Next**.

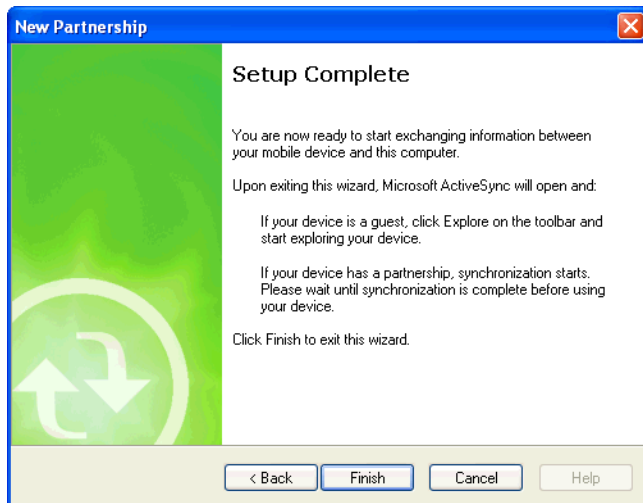


Figure 6-7 Setup Complete Window

5. Click **Finish**.

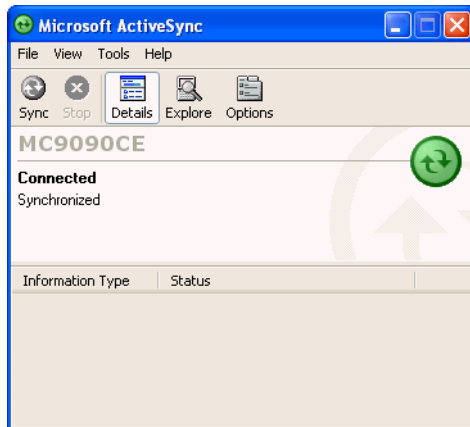


Figure 6-8 ActiveSync Connected Window

During the first synchronization, information stored on the vehicle computer is copied to the host computer. When the copy is complete and all data is synchronized, the vehicle computer can be disconnect from the host computer.

✓ **NOTE** The first ActiveSync operation must be performed with a local, direct connection. To retain partnerships after a cold boot, capture partnership registry information in a .reg file and save it in the Flash File System, detailed information is provided in the *SMDK Help File*.

For more information about using ActiveSync, start ActiveSync on the host computer, then see ActiveSync Help.

Chapter 7 Application Development and Deployment

Introduction

This chapter lists the tools required for developing applications, describes how to package applications and provides procedures for deploying applications onto the VC70.

Software Installation on Development PC (Application Development)

To develop applications to run on the vehicle computer, use one or more of the following:

- Enterprise Mobility Developer Kit (EMDK) for C
- Enterprise Mobility Developer Kit (EMDK) for .NET
- Windows CE Platform SDK for VC70

The EMDK for C is a development tool used to create native C and C++ applications for all vehicle computers. It includes documentation, header files (.H), and library files (.LIB) for native code application development that targets Symbol value-add APIs.

The Windows CE Platform SDK for the VC70 is used in conjunction with the SMDK for C to create Windows CE applications for the VC70 vehicle computer. The Platform SDK installs a new Windows CE device type and its associated libraries onto the development PC. Visual Studio 2008 is used to develop application for the VC70. The new device (like: Motorola VC70 Windows CE PSDK) is added to the active platform configuration.

Platform SDK

To download and install the Platform SDK:

1. Download the appropriate Platform SDK from the Support Central web site <http://supportcentral.motorola.com>:
 - a. On <http://supportcentral.motorola.com>, select *Software Downloads*.
 - b. Select *Mobile Computers* and then select *VC70*.
 - c. Select the *Platform SDK*.
 - d. Save the .exe file to the development computer.
2. Run the file and follow the screen prompts to install.

Enterprise Mobility Developer Kit

To install an SMDK:

1. Download the EMDK from the Support Central web site, <http://supportcentral.motorola.com>:
 - a. On <http://supportcentral.motorola.com>, select *Software Downloads*.
 - b. Select *Mobile Computers* and then select *VC70*.
 - c. Select the latest version of the *Enterprise Mobility Developer Kit*.
 - d. Save the .exe file to the development computer.
2. Double-click the executable file and follow the install screen prompts.
3. Once installed, access the major components of the SMDK from the *Enterprise Mobility Developer Kit* program group of the Windows Start Menu. The components include: Help, Platform Integrator, Readme, Samples, and Web Updates.
4. The sample applications provide examples of how to interface with the Symbol API functions. To build a sample application, open the Samples folder from the Windows *Start* menu. Open the folder for the desired sample and then open the project file. The project file has an extension of VCP. Microsoft Visual C++ v9.0 automatically launches. Select *WinCE* as the Active WCE Configuration. Select Win32 (WCE ARMV4I) Debug as the Active Configuration.



NOTE If both Microsoft Visual C++ v8.0 and Microsoft Visual C++ v9.0 are installed on the development computer, ensure Microsoft Visual C++ v9.0 launches.

Installing Other Development Software

Developing applications for the vehicle computer may require installing other development software such as application development environments on the development PC. Follow the installation instructions provided with this software.

Software Installation on Vehicle Computer

With the appropriate accessory, software, and connection, the vehicle computer can share information with the host device. This chapter provides information about installing software and files on the vehicle computer.

Download or install software using:

- ActiveSync
- Mobility Services Platform (MSP)
- Micro SD Card
- OS Update
- Disk-On Key.

ActiveSync

Use ActiveSync to copy files from a host computer to the vehicle computer.

1. Ensure that ActiveSync is installed and that a partnership has been created, see [Chapter 3, ActiveSync](#).

2. Connect the vehicle computer to the host computer using a USB cable.
3. On the host computer, select  > **Programs > ActiveSync**.
4. Select **Explore**.

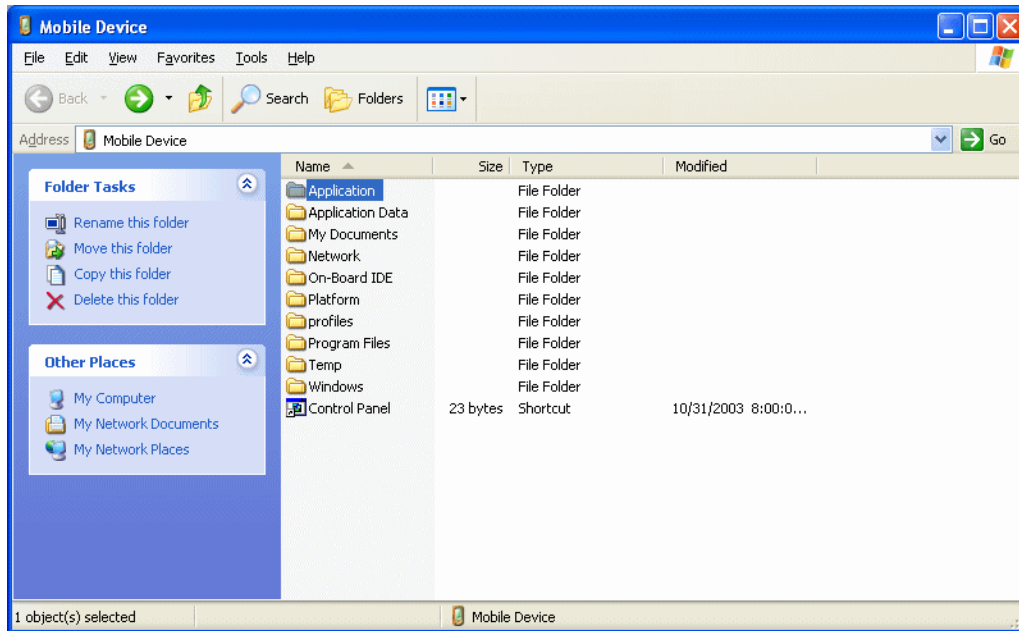


Figure 7-1 ActiveSync Explorer

5. Double-click the folder to expand the contents of the folder.

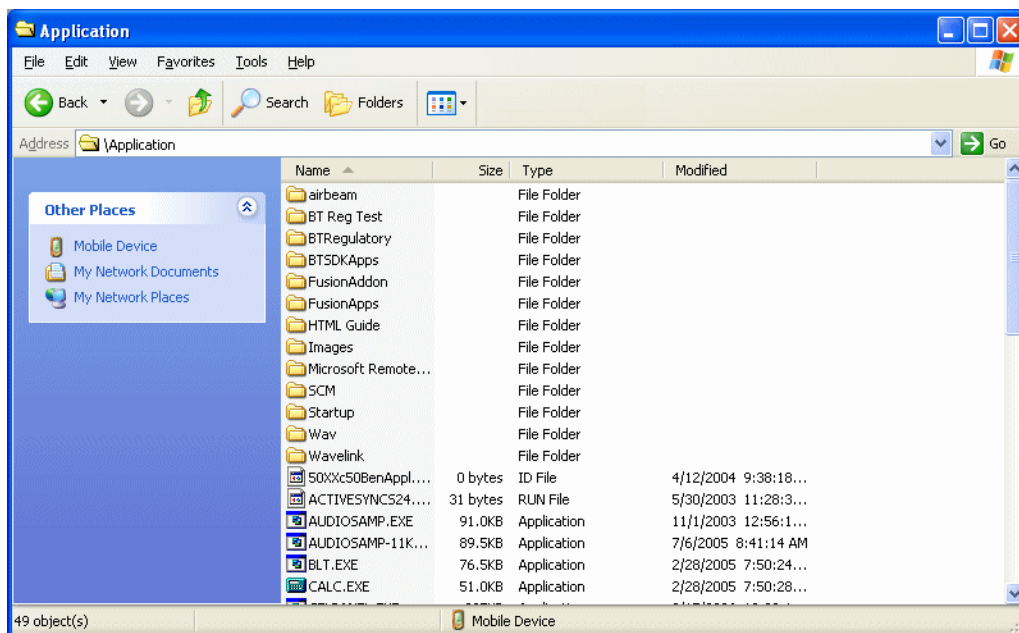


Figure 7-2 Application Folder Contents

6. Use Explorer to locate the host computer directory that contains the file to download. Tap that directory in the left pane to display its contents in the right pane.

7. Drag the desired file(s) from the host computer to the desired mobile device folder.
 - *Program Files* folder: files stored in this folder are discarded after a cold boot.
 - *Application* folder: files stored in this folder are retained after a cold boot.

Micro SD Card

The Micro SD card can be used to download/upload files to and from the vehicle computer. See [Installing a Micro SD Card on page 2-1](#) for instructions for installing an Micro SD card. To view the contents of the Micro SD card, open Windows Explorer and select Storage Card. You can copy files from the Micro SD card to the vehicle computer or double-tap the executable file to launch the application.

Flash Storage

In addition to the RAM-based storage standard on Windows CE vehicle computers, the vehicle computer is also equipped with a non-volatile eMMC-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 vehicle computer includes two FFS partitions. These partitions appear to the vehicle computer 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 two FFS partitions appear as two separate folders in the Windows CE file system and are as follows:

- **Platform:** The Platform FFS partition contains Motorola-supplied programs and Dynamic Link Libraries (DLLs). This FFS is configured to include DLLs that control system operation. Since these drivers are required for basic vehicle computer operation, only experienced users should modify the content of this partition.
- **Application:** The Application FFS partition is used to store application programs needed to operate the vehicle computer.

Working with FFS Partitions

Because the FFS partitions appear as folders under the Windows CE file system, they can be written to and read like any other folder. For example, an application program can write data to a file located in the Application folder just as it would to the Windows folder. However, the file in the Application folder is in non-volatile storage and is not lost on a cold boot (e.g., when power is removed for a long period of time).

Standard tools such as ActiveSync can be used to copy files to and from the FFS partitions. They appear as the "Application" and "Platform" folders to the ActiveSync explorer. This is useful when installing applications on the vehicle computer. Applications stored in the Application folder are retained even when the vehicle computer is cold booted.

There are two device drivers included in the Windows CE image to assist developers in configuring the vehicle computer following a cold boot: RegMerge and CopyFiles.

RegMerge.dll

RegMerge.dll is a built-in driver that allows registry edits to be made to the Windows CE Registry. Regmerge.dll runs very early in the boot process and looks for registry files (.reg files) in certain Flash File System folders during a cold boot. It then merges the registry changes into the system registry located in RAM.

Since the registry is re-created on every cold boot from the default ROM image, the RegMerge driver is necessary to make registry modifications persistent over cold boots.

RegMerge is configured to look in the root of two specific folders for .reg files in the following order:

\Platform
\Application

Regmerge continues to look for .reg files in these folders until all folders are checked. This allows folders later in the list to override folders earlier in the list. This way, it is possible to override Registry changes made by the Platforms partitions folders. Take care when using Regmerge to make Registry changes.



NOTE Regmerge only merges the .reg files on cold boots. The merge process is skipped during a warm boot.

Typically, do not make modifications to registry values for drivers loaded before RegMerge. However, these values may require modification during software development. Since these early loading drivers read these keys before RegMerge gets a chance to change them, the vehicle computer must be cold booted. The warm boot does not re-initialize the registry and the early loading driver reads the new registry values.

Do not use Regmerge to modify built-in driver registry values, or merge the same Registry value to two files in the same folder, as the results are undefined.

CopyFiles

Windows CE expects certain files to be in the Windows folder, residing in volatile storage. Windows CE maintains the System Registry in volatile storage. CopyFiles copies files from one folder to another on a cold boot. Files can be copied from a non-volatile partition (Application or Platform) to the Windows or other volatile partition during a cold boot. During a cold boot CopyFiles looks for files with a .CPY extension in the root of the Platform and Application FFS partitions (Platform first and then Application). These files are text files containing the source and destination for the desired files to be copied separated by ">". The following example from the file application.cpy is contained on the demo application partition included. It can also be obtained from the Support Central web site at <http://supportcentral.motorola.com>.

Files are copied to the Windows folder from the Flash File System using copy files (*.cpy) in the following order:

\Platform
\Application

Example:

\Application\ScanSamp2.exe>\Windows\ScanSamp2.exe

This line directs CopyFiles to copy the ScanSamp2.exe application from the \Application folder to the \Windows folder.

Non-FFS Partitions

Non-FFS Partitions include additional software and data pre-loaded on the vehicle computer that can be upgraded. Unlike FFS Partitions, 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 vehicle computer using files provided by Motorola. The current OS partition on the vehicle computer is included as part of the TCM installation package. Any upgrades must be obtained from Motorola. This partition is mandatory for the vehicle computer.
- Splash Screen: a bitmap smaller than 16 Kb (and limited to 8 bits per pixel) is displayed as the vehicle computer cold boots. To download a customized screen to display, see [Flash Storage on page 7-4](#).



NOTE 8 bits per pixel only applies to splash screen images. Once Windows CE is running, the color density is 16 bits per pixel.

- IPL: This program interfaces with the host computer and allows downloading via serial cable any or all of the partitions listed above, as well as updated versions of IPL. Use caution downloading updated IPL versions; incorrect downloading of an IPL causes permanent damage to the vehicle computer. IPL is mandatory for the vehicle computer.
- Partition Table: Identifies where each partition is loaded in the vehicle computer.

Downloading Partitions to the Vehicle Computer

TCM is used to specify a hex destination file for each partition and download each file to the vehicle computer. This download requires a program loader stored on the vehicle computer. The vehicle computer comes with a program loading utility, Initial Program Loader (IPL), stored in the vehicle computer's write-protected flash.

Chapter 8 Staging and Provisioning

Introduction

The MSP 3 Client Software is a set of software components that come pre-installed on the VC70. The MSP 3 Client software consists of the following three components:

Refer to the Mobility Services Platform 3.2 User's Guide, p/n 72E-100158-06, for instructions for using the Rapid Deployment, AirBEAM Smart and MSP3 Agent clients.

Rapid Deployment (RD) Client

The RD Client provides support for MSP 3 Staging functionality, provides support for the MSP 3 Legacy Staging process, and provides support for backward-compatible legacy MSP 2.x Legacy Staging functionality.

MSP 3 Agent

The MSP 3 Agent provides MSP 3 Provisioning functionality and Control functionality when used with MSP 3.2 Control Edition.

MSP client pre-requisites:

1. The device is connected over WLAN or over wired LAN, and receives IP address.
2. External scanner is connected to provide "Image Update" info scanning option.
3. Barcode image is available.

After all pre-requisites are applied, the MSP client is activated using  > **Settings** > **Rapid Deployment Client** menu.

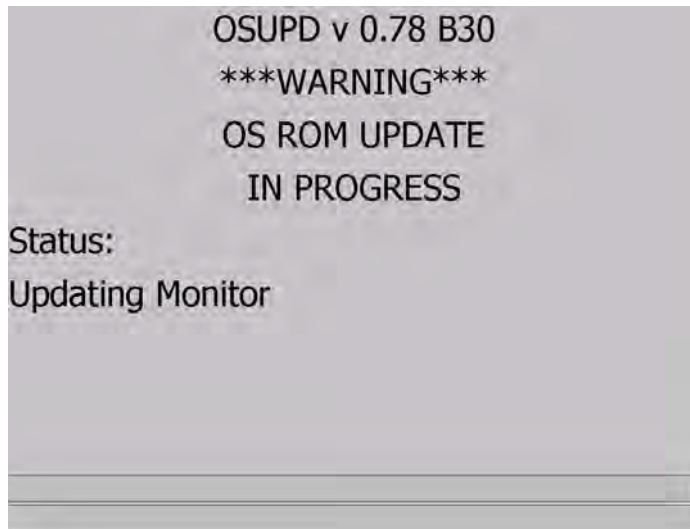
Once the device had acquired the IP address and Rapid Deployment client scanned the provided barcode:

1. The MSP Client contacts the MSP server.
2. The MSP server downloads required files for update to the required location on the device (Micro SD card or other).
3. The MSP client activates update process.
4. The update process normally performs a special sort of boot, followed by flashing of the downloaded files.

5. When flashing is over, the device is automatically rebooted.

✓ **NOTE** The above steps do not require any user interaction.

6. The screen is an example of screens shown on the device during the update process performed via OS Update utility.



Chapter 9 Software Configuration

Introduction

This chapter provides special instructions required for third-party software that can be used with the VC70 vehicle computer.

Wavelink TelnetCE

When using a serial scanner in a Wavelink TelnetCE session, the Wavelink Client communications parameters must be updated to reflect the connection of a scanner to one of the vehicle computer COM ports. Serial options; such as baud rate, data bits, stop bits and parity, of the host session and the scanner must match.

The Wavelink Client defaults are:

- Baud: 9600
- Data bits: 8
- Stop bits: 1
- Parity: None.

Ensure that scanner default parameters match the Wavelink parameters. If they do not, configure the scanner accordingly. Refer to the scanner Product Reference Guide for information on the default scanner settings.

Disabling the VC70 Heater

The VC70 vehicle computer and the optional keyboard contain internal heaters. By default the heaters are enabled. When the vehicle computer or optional keyboard temperature falls below the threshold level, the heater turns on. The heater can be disabled. Use the following registry settings to disable the heater:

For the optional keyboard:

[HKEY_CURRENT_USER\ControlPanel\SystemManagement\KeyboardHeater]

KbdHeaterEnabled”=dword:1 - Making it 0 will never turn on the Keyboard heater.

UsbKbdCheckReqd”=dword:1

For the vehicle computer:

[HKEY_CURRENT_USER\ControlPanel\SystemManagement\DisplayHeater]

DispHeaterEnabled"=dword:1 - Making it 0 will never turn on the Display heater.

Often Used Registry Settings

Power Suspend

To modify the power suspend settings:

Key Name: [HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\Power\Timeouts]

- **Name:** ACSuspendTimeout
 - **Data Type:** dword
 - **Description:** To suspend the device when not used for a certain period of time when operating on external power.
- ✓ **NOTE** When connected to external power, the VC70 enters the "unattended" state rather than "suspend" state.
- **Default Value:** 00000000: 0 seconds (never)
- **Options:**
 - 00000000: Never.
 - 00000060: 1 minute.
 - 00000120: 2 minutes.
 - 00000180: 3 minutes.
 - 00000300: 5 minutes.
 - 00000600: 10 minutes.
 - 00000900: 15 minutes.
 - 00001800: 30 minutes.
- **Name:** BattSuspendTimeout
 - **Data Type:** dword
 - **Description:** To suspend the device when not used for a certain period of time when operating on battery power.
 - **Default Value:** 00000015: 15 seconds
 - **Options:**
 - 00000000: Never.
 - 00000030: 30 seconds.
 - 00000060: 1 minute.
 - 00000120: 2 minutes.
 - 00000180: 3 minutes.
 - 00000240: 4 minutes.
 - 00000300: 5 minutes.
 - 00000360: 6 minutes.

External Antenna

Key Name: [HKEY_CURRENT_USER\ControlPanel\SystemManagement\Antenna Selection]

- **Name:** SelectedAntenna
 - **Data Type:** dword
 - **Description:** Selects internal or external antenna.
 - **Default Value:** 00000000: Internal antenna.
 - **Options:**
 - 00000000: Internal antenna.
 - 00000001: External antenna.

Ignition Timeout

Key Name: [HKEY_CURRENT_USER\ControlPanel\SystemManagement\IgnSense]

- **Name:** Ignition Timeout
 - **Data Type:** dword
 - **Description:** Forklift ignition timeout
 - **Default Value:** 00000180: 3 minutes.
 - **Options:**
 - 00000000: Never.
 - 00000060: 1 minute.
 - 00000120: 2 minutes.
 - 00000180: 3 minutes.
 - 00000300: 5 minutes.
 - 00000600: 10 minutes.
 - 00000900: 15 minutes.
 - 00001800: 30 minutes.

Registry Values for P1/P2/P3/P4 Keys

Key Name: [HKEY_LOCAL_MACHINE\SOFTWARE\symbol\ProgrammableKeys\P1]
 [HKEY_LOCAL_MACHINE\SOFTWARE\symbol\ProgrammableKeys\P2]
 [HKEY_LOCAL_MACHINE\SOFTWARE\symbol\ProgrammableKeys\P3]
 [HKEY_LOCAL_MACHINE\SOFTWARE\Symbol\ProgrammableKeys\P4]

- **Name:** Action
 - **Data Type:** REG_dword
 - **Description:** Sets the function of the Px key.
 - **Default Value:** 00000000: No action.
 - **Options:**
 - 00000000: No action.
 - 00000001: Launch Application.
 - 00000002: Simulate Key Press.
 - 00000003: Toggle SIP.
 - 00000004: Toggle Touch.
 - 00000005: Play Key Sequence.
 - 00000006: Launch calibration.

- **Name:** ApplicationPath
 - **Data Type:** String
 - **Description:** Used to specify which application to invoke with the press of Px key. Required only when action is Launch Application.
- **Name:** CommandLine
 - **Data Type:** String
 - **Description:** Used to specify any command line argument to the application to be invoked with the press of Px key. Required only when action is Launch Application.
- **Name:** Modifier
 - **Data Type:** dword
 - **Description:** Used to specify modifier key for the simulated key press P1. Required only when action is Simulate Keypress.
- **Name:** RepeatKey
 - **Data Type:** dword
 - **Description:** Used to specify if repeat key is on or off. required only when action is Simulate Keypress.
- **Name:** KeyPress
 - **Data Type:** String
 - **Description:** Used to specify key press for Simulate Key press. Required only when action is Simulate Keypress.
- **Name:** KeySequence
 - **Data Type:** String
 - **Description:** Used to specify key press for Simulate Key press. Required only when action is Simulate Keypress.

Disabling the Fusion RX Sensitivity Degradation

Key Name: [HKEY_LOCAL_MACHINE\Comm\XWING20_1\Parms]

DesenseRxEnable="1"

Chapter 10 Maintenance

Introduction

This chapter includes instructions on cleaning and storing the vehicle computer, and provides troubleshooting solutions for potential problems during vehicle computer operation.

Maintaining the Vehicle Computer

✓ **NOTE** Whenever the VC70 is being replaced on a fork lift, ensure that the VC70 is compatible with the power cable installed on the truck.

For trouble-free service, observe the following tips when using the vehicle computer:

- Take care not to scratch the screen of the vehicle computer. When working with the vehicle computer, use your finger tip or plastic-tipped pens intended for use with a touch-sensitive screen. Never use an actual pen or pencil or other sharp object on the surface of the vehicle computer screen.
- Although the vehicle computer is water and dust resistant, do not expose it to rain or moisture for an extended period of time. In general, treat the vehicle computer as you would any other electronic device.
- The screen of the vehicle computer is glass. Do not drop the vehicle computer or subject it to strong impact.
- Protect the vehicle computer from temperature extremes.
- Do not store or use the vehicle computer in any location that is extremely dusty, damp, or wet.
- Use a soft lens cloth to clean the vehicle computer. If the surface of the vehicle computer screen becomes soiled, clean it with a soft cloth moistened with a diluted window-cleaning solution.
- Periodically check nuts and bolts to ensure they are tightened to the proper torque.
- Ensure that you have spare screws when changing desiccant bags and SD cards.

Returning the Vehicle Computer for Service



NOTE Motorola has taken great care to ensure environmental conditions such as humidity will not affect the stability of the vehicle computer. This is accomplished by means of desiccant bags which can be inserted by the user upon receipt of the vehicle computer. In the event, the vehicle computer needs to be shipped by air carrier to Motorola for repair or maintenance, it is essential that the user remove the desiccant door cover before the vehicle computer is packaged for shipment. The reason for this step is to avoid compromising the vehicle computer as a result of pressurization during air transit. The user must simply remove the screws associated with the desiccant door on the back of the unit. Discard the used desiccant bags. Upon receipt of the repaired vehicle computer, the user should insert new desiccant bags (if used) and reseal the doors using new screws.

Replacing the Desiccant Bag

1. The VC70 ships with a desiccant bag installed. The installer may wish to replace the desiccant in the VC70 with a new bag prior to installing the VC70 on the vehicle, as transit and storage may have saturated the desiccant.
2. Open the two screws securing the service door and remove the door.



CAUTION Do not use any sharp tool to pull the desiccant bag out of the VC70. Failure to comply may cause tear of the bag and damage to the VC70.

3. Pull out the old desiccant bag using the attached tab.
4. Open the new desiccant package and remove the desiccant bag.
5. Fold the four corners of the bag under to form a pillow.
6. Place the desiccant bag in the desiccant well.

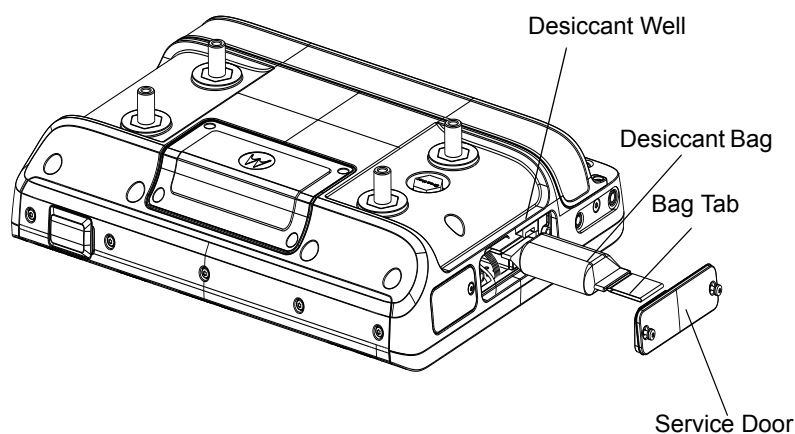


Figure 10-1 Replacing the Desiccant Bag

7. Carefully place the service door onto the right side of the housing.



CAUTION Be sure to torque the screws to seal the device properly. Otherwise, sealing can be compromised.

8. Secure the door to the housing using the two captive screws. Torque to 9 ± 0.5 kgf.cm (7.8 ± 0.4 in-lbs).

Replacing the Backup Battery

To replace the backup battery:



CAUTION Use ESD precautions when installing the backup battery.

1. Place the Main Power switch on the right side of the vehicle computer to the off position and perform cold boot to electrically disconnect the battery from the unit.
2. Open the four screws securing the Backup Battery door on the back of the vehicle computer and remove the door.
3. Open the four screws securing the Backup Battery and disconnect the Backup Battery connector.
4. Carefully pull the Backup Battery out of the computer.
5. Place the new backup battery into the well.

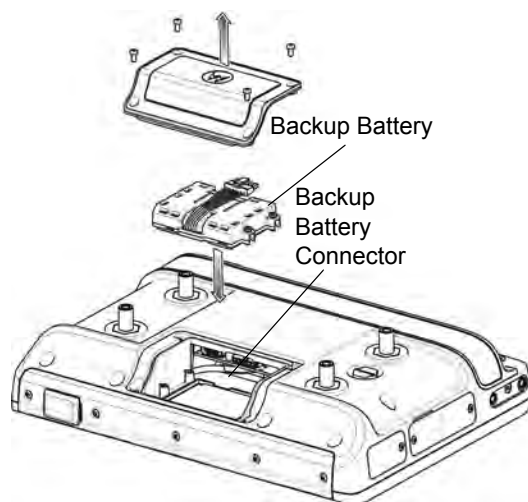


Figure 10-2 *Replacing the Backup Battery*

6. Connect the Backup Battery connector to the connector inside the Backup Battery well.
7. Secure the battery into location using four screws.
8. Place the Backup Battery door over the battery and secure using the four captive screws.



CAUTION Be sure to torque the screws to seal the device properly. Otherwise, sealing can be compromised.

9. Torque the screws to 9 +/- 0.5 kgf.cm (7.8 ± 0.4 in-lbs).
10. Place the Main Power switch to the on position.

It takes four hours to fully charge the Backup Battery.

Troubleshooting

Table 10-1 Vehicle Computer Problems

Symptom	Possible Cause	Action
Vehicle computer does not power on or shuts off suddenly.	The power cable ignition sense wire (yellow) is not connected properly.	Verify that the power cable is connected properly. See Electric Forklifts on page 2-12 .
	Main power switch on right side of the vehicle computer is in the Off position.	Turn the main power switch on.
	Power cable not connected properly or unplugged.	Connect power cable to power cable portion underside of vehicle computer. Turn the main power switch on.
	If the vehicle computer is powered by a vehicle battery, the vehicle battery is depleted.	Replace or charge the vehicle battery.
Cannot see characters on display.	Vehicle computer not powered on or suspended (Power LED is off).	Press the Power switch on the Quick Access Panel. Turn the main power switch on top of the vehicle computer to the on position.
	Screen is too bright/dark.	Adjust the brightness; see Adjusting the Brightness on page 3-9 .
	Display not adjusted properly.	Select Display in the Control Panel settings and adjust the display.
	The vehicle computer is in Suspend mode (Power LED is off).	Press the Power button on the Quick Access Panel to turn on the vehicle computer.
Touchscreen not working.	Display not properly calibrated.	Recalibrate the screen through the Control Panel Calibration utility. If problem continues, contact Motorola Enterprise Mobility Support. See Service Information on page xiv .
	Replacement screen protector was not applied correctly.	Replace or re-apply screen protector.
Optional serial scanner does not operate.	Scanner is not properly connected to the vehicle computer.	Connect the scanner to the COM1 port. Ensure the proper COM port is selected in the DataWedge application, see Installing a Scanner on page 2-24 . If the problem continues, refer to the scanner Product Reference Guide.
	DataWedge application is not enabled or set to the correct COM Port.	Ensure that the DataWedge application is enabled and set to the correct port. See Setting up a Scanner Using Data Wedge on page 2-39 .
	External power is not connected.	Verify external power connection.

Table 10-1 *Vehicle Computer 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 Motorola Enterprise Mobility Support. See Service Information on page xiv .
	The optional external speaker cable is connected without the speaker.	Connect the external speaker, or, disconnect the cable.
Missing pixels on the display.	Faulty LCD.	Contact Motorola Enterprise Mobility Support. See Service Information on page xiv .
COM1 or COM2 port is not working.	Another application, ActiveSync or SerialWedge is using the port.	Stop the application using the port, disconnect the ActiveSync cable from the host, or change the SerialWedge COM port setting.
No response when ActiveSync is initiated.	ActiveSync cable not connected properly.	Connect the ActiveSync cable.
	ActiveSync is not configured properly.	Configure ActiveSync in the Control Panel. See Setting Up an ActiveSync Connection on the Host Computer on page 6-3 .
No keys are working on the optional or built-in keyboard.	The optional keyboard is not properly connected to the vehicle computer.	Check the cable connections between the keyboard and the vehicle computer.
	The application does not require keyboard input.	Configure the application to use the keyboard.
	Vehicle computer is not responding.	Warm boot the vehicle computer.
COMM LED is off.	Lost network connection.	If problem continues, contact Motorola Enterprise Mobility Support. See Service Information on page xiv .
	COMM LED is turned off.	Enable the COMM LED using the Control Panel. See COMM LED on page 3-3
Vehicle computer cannot find any Bluetooth devices nearby.	Too far from other Bluetooth devices.	Move closer to the other Bluetooth device(s), within a range of 10 meters.
	The Bluetooth device(s) nearby are not turned on.	Turn on the Bluetooth device(s) you wish to find.
	The Bluetooth device(s) are not in discoverable mode.	Set the Bluetooth device(s) to discoverable mode. If needed, refer to the device's user documentation for help.

Appendix A Specifications

Technical Specifications

The following tables summarize the vehicle computer's intended operating environment and general technical hardware specifications.

Vehicle Computer

The following table summarizes the vehicle computer's intended operating environment.

Table A-1 *Technical Specifications*

Item	Characteristics
Physical and Environmental Characteristics	
Dimension	11.5 in. L x 8.9 in. W x 2.4 in. D 291 mm L x 225.4 mm W x 60 mm D
Weight	9.4 lbs./4.3 kg
Keyboard Options	3 keyboards, all backlit with IP66 sealing and tactile feedback: QWERTY or AZERTY, 65-key with function keys F1-F24; side-mounted 21-key Numeric/Functional keypad
Power	External IP66 sealed 9-60V DC/DC converter for all engines with 12V, 24V, 36V or 48V truck battery; External 100-240VAC power supply for AC-powered carts
Integrated Dual-function Battery	Provides up to 30 minutes session persistence during forklift battery swap and up to 72 hours RAM backup
Display	10.4 in. color XGA (1024 x 768) LCD; 600 NIT LED backlit; resistive touchscreen; auto brightness control with ambient light sensor or manual control; motion sensing blanking
Interface Ports	Standard sealed and secured connectors: 2 RS-232 serial ports (COM1 with 5V/1.5A, COM2 with 5V/0.5A) 2 USB port (host, both 5V/1.5A) 1 USB OTG (service) CAN-Bus (J1939) 10/100Mbps Ethernet

Table A-1 *Technical Specifications (Continued)*

Item	Characteristics
Audio	Built-in front-mounted 2W speaker; external 13 watt speaker and external Push-To-Talk microphone that is ready for voice communication and voice-assisted applications
Performance Characteristics	
CPU	TI OMAP4430 processor at 800MH - 1GHz in turbo mode
Operating System	Windows Embedded Compact 7 (WEC 7)
Memory (RAM/ROM)	512MB DDR2 volatile memory, 4GB EMMC non volatile memory
Expansion	Micro SD, SDHC Class 10 Card, up to 32 GB
Application Development	PSDK, and SMDK available through Support Central Web Site
Data Capture Options	Optional external scanner
User Environment	
Operating Temperature for VC70 Freezer Configuration	-22°F to 122°F (-30°C to 50°C)
Operating Temperature for VC70 Non-freezer Configuration	-4°F to 122°F (-20°C to 50°C)
Storage Temperature	-40°F to 158°F (-40°C to 70°C)
Battery Charging Temperature	32 °F to 104 °F (0 °C to +40 °C) ambient temperature range.
Humidity	5% to 95% condensing
Environmental Sealing	IP66
ESD	±15kV air discharge, ±8kV direct discharge
Wireless Data Communications	
WLAN	802.11a/b/g/n
Output Power	100mW U.S. and International
Data Rate	802.11a: up to 54Mb per second 802.11b: up to 11Mb per second 802.11g: up to 54Mb per second 802.11n: up to 65Mb per second
Antenna	Internal WLAN diversity antenna; optional external WLAN antenna with diversity; internal Bluetooth antenna

Table A-1 *Technical Specifications (Continued)*

Item	Characteristics
Frequency Range:	802.11a: 5 GHz 802.11b: 2.4 GHz 802.11g: 2.4 GHz 802.11n: 2.4 GHz & 5 GHz
Bluetooth	Bluetooth Version 2.1. A full featured SDK is available for download from Support Central.
Regulatory	
Electrical Safety	UL/cUL/IEC/EN 60950-1 Indoor use and UL/cUL/IEC/EN 60950-22 Outdoor use
EMI/RFI	North America: FCC Part 15, Class B; Canada: ICES 003 Class B; EU: EN55022, EN 301 489-1, EN 301 489-17
WLAN/Bluetooth	USA: FCC Part 15.247, 15.407 Canada: RSS-210; EU: EN 300 328, EN 301 893 AU/NZ: AS/NZS 4268
Environmental	RoHS/WEEE compliant
Flammability	IEC UL94-VO

Vehicle Computer Connectors

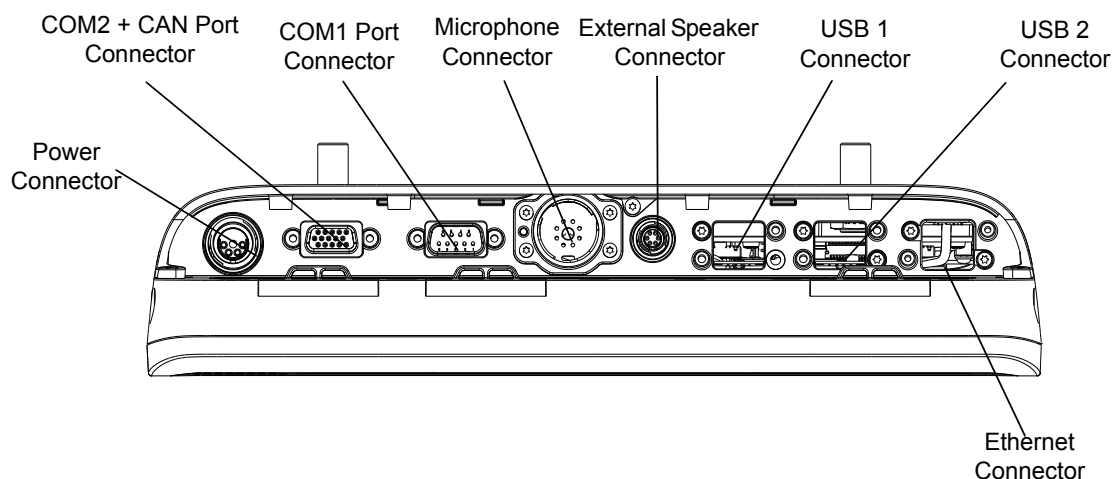
**Figure A-1** *VC70 Connectors*

Table A-2 Power Connector Pin-Outs

Pin	Signal	Description
A	12V_IN	12V output from AC supply/battery
B	12V_IN	12V output from AC supply/battery
C	GND	Ground
D	GND	Ground
1	Ignition	Ignition Sense input from forklift
2	POW_GOOD	
3	SW_Shutdown	
4	HW_Shutdown	
5	GND	Ground

Mating connector: LF13WBP-11S

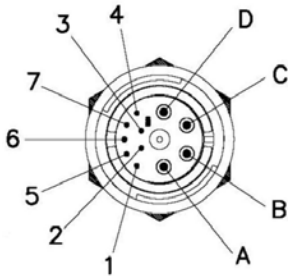


Table A-3 USB Connector Pin-Outs (two connectors)

Pin	Signal	Description
1	Vbus	5 VDC USB power (1.5A)
2	D-	USB negative signal
3	D+	USB positive signal
4	GND	Ground

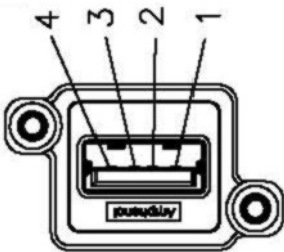
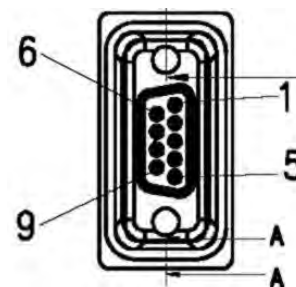


Table A-4 COM1 Connector Pin-Outs

Pin	Signal	Description
1	DCD1	Data Carrier Detect input to VC70
2	RxD1	Serial data input to VC70
3	TxD1	Serial data output to VC70
4	DTR1	Data Terminal Ready output from VC70
5	GND	Ground
6	DSR1	Data Set Ready
7	RTS1	Request To Send output from VC70
8	CTS1	Clear To Send input to VC70
9	5V out	5 VDC switched power output to peripherals (1.5A)

**Table A-5** COM2 Connector Pin-Outs

Pin	Signal	Description
1	DCD2	Data Carrier Detect input to VC70
2	RxD2	Serial data input to VC70
3	TxD2	Serial data output to VC70
4	DTR2	Data Terminal Ready output from VC70
5	GND	Ground
6	DSR2	Data Set Ready
7	RTS2	Request To Send output from VC70
8	CTS2	Clear To Send input to VC70
9	5V out	5 VDC switched power output to peripherals (500mA)
10	GND	Ground
11	GND	Ground
12	GND	Ground
13	CAN_P	CAN BUS Positive
14	CAN_N	CAN BUS Negative
15	CAN_GND	CAN BUS Ground

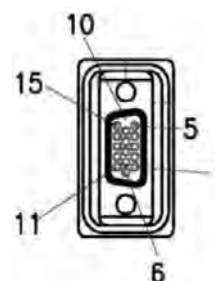
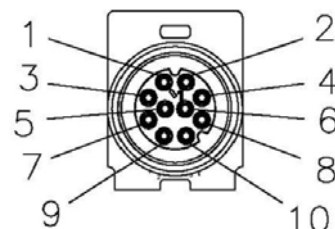


Table A-6 External Microphone Connector Pin-Outs

Pin	Signal	Description
1		
2	PTT	Push-to-Talk button signal from handset
3		
4		
5	GND/MIC_-	Audio input from microphone
6		
7	MIC_+	Audio input from microphone
10	MIC_Detect	External microphone detection

Mating cable: mating cable Mot PN: 3064078H01/H02

**Table A-7** External Speaker Connector Pin-Outs

Pin	Signal	Description
1	SPK_POS	Speaker output
2	SPK_POS	Speaker output
3	SPK_NEG	Speaker output
4	SPK_NEG	Speaker output
5	GND	Ground
6	SPK_Detect	External speaker detection

Mating connector: LF07WBP-6P

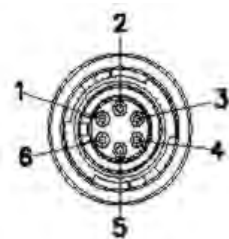
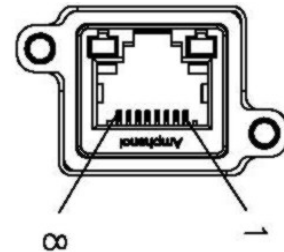


Table A-8 Ethernet Connector Pin-Outs

Pin	Signal	Description
1	TX_P	Transmit +
2	TX_N	Transmit -
3	RX_P	Receive +
4	GND	Ground
5	GND	Ground
6	RX_N	Receive -
7	GND	Ground
8	GND	Ground



Glossary

A

API. An interface by means of which one software component communicates with or controls another. Usually used to refer to services provided by one software component to another, usually via software interrupts or function calls

Application Programming Interface. See **API**.

ASCII. American Standard Code for Information Interchange. A 7 bit-plus-parity code representing 128 letters, numerals, punctuation marks and control characters. It is a standard data transmission code in the U.S.

B

BIOS. Basic Input Output System. A collection of ROM-based code with a standard API used to interface with standard PC hardware.

Bit. Binary digit. One bit is the basic unit of binary information. Generally, eight consecutive bits compose one byte of data. The pattern of 0 and 1 values within the byte determines its meaning.

Bits per Second (bps). Bits transmitted or received.

bps. See **Bits Per Second**.

Byte. On an addressable boundary, eight adjacent binary digits (0 and 1) combined in a pattern to represent a specific character or numeric value. Bits are numbered from the right, 0 through 7, with bit 0 the low-order bit. One byte in memory is used to store one ASCII character.

boot or boot-up. The process a computer goes through when it starts. During boot-up, the computer can run self-diagnostic tests and configure hardware and software.

C

Cold Boot. A cold boot restarts the vehicle computer and erases all user stored records and entries.

COM port. Communication port; ports are identified by number, e.g., COM1, COM2.

D

Data Communications Equipment (DCE). A device (such as a modem) which is designed to attach directly to a DTE (Data Vehicle Computer Equipment) device.

DCE. See **Data Communications Equipment**.

Device Configuration Package. The Symbol Device Configuration Package provides the Product Reference Guide (PRG), flash partitions, Vehicle Computer Configuration Manager (TCM) and the associated TCM scripts. With this package hex images that represent flash partitions can be created and downloaded to the vehicle computer.

DRAM. Dynamic random access memory.

DTE. See **Data Vehicle Computer Equipment**.

E

ENQ (RS-232). ENQ software handshaking is also supported for the data sent to the host.

ESD. Electro-Static Discharge

F

Flash Disk. An additional megabyte of non-volatile memory for storing application and configuration files.

Flash Memory. Flash memory is nonvolatile, semi-permanent storage that can be electronically erased in the circuit and reprogrammed. The vehicle computers use Flash memory to store the operating system, and the vehicle computer emulators.

File Transfer Protocol (FTP). A TCP/IP application protocol governing file transfer via network or telephone lines. See **TCP/IP**.

FTP. See **File Transfer Protocol**.

Flash Memory. Flash memory is responsible for storing the system firmware and is non-volatile. If the system power is interrupted the data is not be lost.

H

Hard Reset. See **Cold Boot**.

Hz. Hertz; A unit of frequency equal to one cycle per second.

Host Computer. A computer that serves other vehicle computers in a network, providing such services as computation, database access, supervisory programs and network control.

I

IDE. Intelligent drive electronics. Refers to the solid-state hard drive type.

IEEE Address. See **MAC Address**.

IOCTL. Input/Output Control.

Internet Protocol Address. See **IP**.

I/O Ports. interface The connection between two devices, defined by common physical characteristics, signal characteristics, and signal meanings. Types of interfaces include RS-232 and PCMCIA.

Input/Output Ports. I/O ports are primarily dedicated to passing information into or out of the vehicle computer's memory. VC70 vehicle computers include Serial and USB ports.

IP. Internet Protocol. The IP part of the TCP/IP communications protocol. IP implements the network layer (layer 3) of the protocol, which contains a network address and is used to route a message to a different network or subnetwork. IP accepts "packets" from the layer 4 transport protocol (TCP or UDP), adds its own header to it and delivers a "datagram" to the layer 2 data link protocol. It may also break the packet into fragments to support the maximum transmission unit (MTU) of the network.

IP Address. (Internet Protocol address) The address of a computer attached to an IP network. Every client and server station must have a unique IP address. A 32-bit address used by a computer on a IP network. Client workstations have either a permanent address or one that is dynamically assigned to them each session. IP addresses are written as four sets of numbers separated by periods; for example, 204.171.64.2.

IPX/SPX. Internet Package Exchange/Sequential Packet Exchange. A communications protocol for Novell. IPX is Novell's Layer 3 protocol, similar to XNS and IP, and used in NetWare networks. SPX is Novell's version of the Xerox SPP protocol.

IS-95. Interim Standard 95. The EIA/TIA standard that governs the operation of CDMA cellular service. Versions include IS-95A and IS-95B. See CDMA.

L

LCD. See **Liquid Crystal Display**.

LED Indicator. A semiconductor diode (LED - Light Emitting Diode) used as an indicator, often in digital displays. The semiconductor uses applied voltage to produce light of a certain frequency determined by the semiconductor's particular chemical composition.

Liquid Crystal Display (LCD). A display that uses liquid crystal sealed between two glass plates. The crystals are excited by precise electrical charges, causing them to reflect light outside according to their bias. They use little electricity and react relatively quickly. They require external light to reflect their information to the user.

Light Emitting Diode. See **LED**.

N

NVM. Non-Volatile Memory.

O

ODI. See **Open Data-Link Interface**.

Open Data-Link Interface (ODI). Novell's driver specification for an interface between network hardware and higher-level protocols. It supports multiple protocols on a single NIC (Network Interface Controller). It is capable of understanding and translating any network information or request sent by any other ODI-compatible protocol into something a NetWare client can understand and process.

Open System Authentication. Open System authentication is a null authentication algorithm.

P

PAN . Personal area network. Using Bluetooth wireless technology, PANs enable devices to communicate wirelessly. Generally, a wireless PAN consists of a dynamic group of less than 255 devices that communicate within about a 33-foot range. Only devices within this limited area typically participate in the network.

Parameter. A variable that can have different values assigned to it.

PING. (Packet Internet Groper) An Internet utility used to determine whether a particular IP address is online. It is used to test and debug a network by sending out a packet and waiting for a response.

Print Contrast Signal (PCS). Measurement of the contrast (brightness difference) between the bars and spaces of a symbol. A minimum PCS value is needed for a bar code symbol to be scannable. $PCS = (RL - RD) / RL$, where RL is the reflectance factor of the background and RD the reflectance factor of the dark bars.

Programming Mode. The state in which a scanner is configured for parameter values. See **Scanning Mode**.

Q

QWERTY. A standard keyboard commonly used on North American and some European PC keyboards. “QWERTY” refers to the arrangement of keys on the left side of the third row of keys.

R

RAM. Random Access Memory. Data in RAM can be accessed in random order, and quickly written and read.

Reflectance. Amount of light returned from an illuminated surface.

Resolution. The narrowest element dimension which is distinguished by a particular reading device or printed with a particular device or method.

RF. Radio Frequency.

ROM. Read-Only Memory. Data stored in ROM cannot be changed or removed.

Router. A device that connects networks and supports the required protocols for packet filtering. Routers are typically used to extend the range of cabling and to organize the topology of a network into subnets. See **Subnet**.

RS-232. An Electronic Industries Association (EIA) standard that defines the connector, connector pins, and signals used to transfer data serially from one device to another.

S

Scanner. An electronic device used to scan bar code symbols and produce a digitized pattern that corresponds to the bars and spaces of the symbol. Its three main components are: 1) Light source (laser or photoelectric cell) - illuminates a bar code;; 2) Photodetector - registers the difference in reflected light (more light reflected from spaces); 3) Signal conditioning circuit - transforms optical detector output into a digitized bar pattern.

SDK. Software Development Kit

Shared Key. Shared Key authentication is an algorithm where both the AP and the MU share an authentication key.

SID. System Identification code. An identifier issued by the FCC for each market. It is also broadcast by the cellular carriers to allow cellular devices to distinguish between the home and roaming service.

SMDK. Symbol Mobility Developer's Kit.

Soft Reset. See **Warm Boot**.

Subnet. A subset of nodes on a network that are serviced by the same router. See **Router**.

Subnet Mask. A 32-bit number used to separate the network and host sections of an IP address. A custom subnet mask subdivides an IP network into smaller subsections. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets. Default is often 255.255.255.0.

Substrate. A foundation material on which a substance or image is placed.

T

TCP/IP. (Transmission Control Protocol/Internet Protocol) A communications protocol used to internetwork dissimilar systems. This standard is the protocol of the Internet and has become the global standard for communications. TCP provides transport functions, which ensures that the total amount of bytes sent is received correctly at the other end. UDP is an alternate transport that does not guarantee delivery. It is widely used for real-time voice and video transmissions where erroneous packets are not retransmitted. IP provides the routing mechanism. TCP/IP is a routable protocol, which means that all messages contain not only the address of the destination station, but the address of a destination network. This allows TCP/IP messages to be sent to multiple networks within an organization or around the world, hence its use in the worldwide Internet. Every client and server in a TCP/IP network requires an IP address, which is either permanently assigned or dynamically assigned at startup.

Telnet. A vehicle computer emulation protocol commonly used on the Internet and TCP/IP-based networks. It allows a user at a vehicle computer or computer to log onto a remote device and run a program.

Terminal Computer Emulation. A “terminal computer emulation” emulates a character-based mainframe session on a remote non-mainframe terminal computer, including all display features, commands and function keys. The VC70 Series supports Terminal Computer Emulations in 3270, 5250 and VT220.

TFTP. (Trivial File Transfer Protocol) A version of the TCP/IP FTP (File Transfer Protocol) protocol that has no directory or password capability. It is the protocol used for upgrading firmware, downloading software and remote booting of diskless devices.

Tolerance. Allowable deviation from the nominal bar or space width.

Transmission Control Protocol/Internet Protocol. See **TCP/IP**.

Trivial File Transfer Protocol. See **TFTP**.

U

UDP. User Datagram Protocol. A protocol within the IP protocol suite that is used in place of TCP when a reliable delivery is not required. For example, UDP is used for real-time audio and video traffic where lost packets are simply ignored, because there is no time to retransmit. If UDP is used and a reliable delivery is required, packet sequence checking and error notification must be written into the applications.

V

VC. Vehicle Computer.

Vehicle Computer. In this text, *vehicle computer* refers to the VC70 vehicle computer. It can be set up to run as a stand-alone device, or it can be set up to communicate with a network, using wireless radio technology.

W

Warm Boot. A warm boot restarts the vehicle computer by closing all running programs. All data that is not saved to flash memory is lost.

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