Schlumberger

RoadMAPS™ User's Manual

Version 2.0

Trademarks used in this manual

RouteMaps™ and RoadMAPS™ are trademarks of Schlumberger Resource Management Services, Inc. Other brands or product names are the trademarks or registered trademarks of their respective holders.

FCC Registration

RoadMAPS Unit complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

(1) This unit may not cause harmful interference, and

(2) This unit must accept any interference received, including interference that may cause undesired operation.

RoadMAPS Unit device complies with Industry Canada RS210

Operation is subject to the following two conditions:

(1) RoadMAPS Unit may not cause interference, and

(2) RoadMAPS Unit must accept any interference, including interference that may cause undesired operation of the unit.

RoadMAPS™ User's Manual 2.0
Literature No. SY-0043.1-GB-012.99

Resource Management Services
5430 Metric Place
Norcross, GA 30092-2550
Tel: (770) 446-1991
Fax: (770) 263-8104

Contents

1 Introduction

System Operations 1-1
About this Manual 1-2
Conventions Used in This Manual 1-3
Product Support Within the United States 1-4
Contacting technical support 1-4

2 RoadMAPS Overview

RoadMAPS Features 2-2
The Laptop 2-3
PC Memory Card Port 2-4
Navigation 2-5
RoadMAPS Software 2-6
RoadMAPS Display 2-6
RoadMAPS Function Buttons 2-7
Reading indicator 2-8
Message area and progress bar 2-9
Information area 2-10
Route Selection Screen 2-11
Route Display Screens 2-12
RoadMAPS Unit 2-13
RF Receiver 2-14
Radio Frequency (RF) Front End 2-14
Digital Multi-channel Receiver (DMR) 2-14
Central Processing Unit (CPU) 2-15

RF Transmitter 2-16
Logic Control 2-16
Transmitter 2-16
Power Supply 2-16
Antenna and Duplexer 2-18

3 Setting Up the RoadMAPS Unit

Removing Carrying Case Cover 3-1
To remove the carrying case cover 3-2
Inserting the PC Memory Card 3-2
Placing the RoadMAPS Unit in the Vehicle 3-4
Connecting the Antenna 3-6
Plugging in the Power Cable 3-9
Turning the Unit On 3-10
To start RoadMAPS Software 3-10
If No Route Data File is Found 3-11
Adjusting System Settings 3-12
Backlight 3-12
Contrast 3-12

4 Using the RoadMAPS Unit

Route File Generation 4-2
Off-site meter reading 4-2
File Transfer to Host and Billing System 4-4
Using PC Memory Cards to Exchange Information 4-4

To exchange information with the host computer 4-4
Reading Meters 4-5
Beeper Settings 4-6
To turn the beeper on or off 4-7
Selecting Routes 4-8
Detail Settings 4-10
To view account detail 4-11
Collecting Readings 4-12
To begin meter reading 4-12
Navigation on the Route Display Screen 4-15
To view routes 4-15
Identifying Missed Accounts 4-16
Viewing Account Details 4-17
To move from one account to the next 4-18
To display account detail 4-18
Rereading Missed Accounts 4-19
Pausing and Restarting Meter Reading 4-19
Creating an Export File 4-20
Exiting RoadMAPS Software 4-21

5 **Closing the RoadMAPS Unit**

A **Specifications**

Electrical Specifications A-1
Laptop PC Specifications A-1

Environmental Conditions A-2
Dimensions and Weight A-2

B Troubleshooting

Performing Diagnostics B-2
To display and exit RoadMAPS self diagnostics B-2

C Glossary

Glossary

Index

Figures

Figure	Title	Page
1.1	RoadMAPS Meter Reading Operations	1-2
2.1	RoadMAPS Unit	2-2
2.2	Laptop	2-3
2.3	Memory Card Port	2-4
2.4	Navigating Within RoadMAPS	2-5
2.5	Route Selection screen	2-11
2.6	Missed Reads and Captured Reads Screens	2-12
2.7	MIU Details Dialog Box	2-13
2.8	RoadMAPS Unit Diagram	2-14
3.1	Latches on RoadMAPS carrying case	3-2
3.2	PC memory card slot	3-3
3.3	Removing the Safety Latch	3-4
3.4	Placing Seatbelt in Retention Loop	3-5
3.5	Replacing the Safety Pin	3-5
3.6	Securing the unit	3-6
3.7	Cables retained by Velcro strapping	3-7
3.8	Antenna routing	3-8
3.9	Antenna placement	3-8
3.10	Cigarette lighter power cable	3-9
3.11	Laptop Keys	3-10
3.12	Error Message on start up	3-11
4.1	Host File Transfer to RoadMAPS	4-2
4.2	RoadMAPS Automatic Meter Reading	4-3
4.3	Reading File Transfer to Host	4-4
4.4	Route Display with multiple routes being read	4-6
4.5	Use Beeper Field	4-7
4.6	Route Selection Screen	4-8
4.7	Missed Reads Screen	4-9
4.8	MIU Details Dialog Box	4-10
4.9	Route Selection Screen with Account Highlighted	4-11
4.10	Meter Reading	4-13

Figure	Title	Page
4.11	Route With All Reads Completed	4-14
4.12	Route Selection Screen	4-15
4.13	Captured Reads Screen Message Area	4-16
4.14	Viewing Details of an Account	4-17
4.15	MIU Details Dialog Box	4-18
5.1	Laptop and cables prepared for closing	5-2
5.2	Cover replaced on RoadMAPS Unit	5-3
A.1	RoadMAPS Unit Dimensions	A-2
B.1	Route Import Screen	B-3
B.2	System Check Screen	B-3

Tables

Table	Title	Page
2.1	Operating Voltage and Current	2-17
A.1	Electrical Specifications	A-1
A.1	PC Specifications	A-1
A.1	Environmental Conditions	A-2
A.1	Dimensions and Weight	A-2
B.1	Troubleshooting Table	B-1

Notes:

Chapter 1 Introduction

The RoadMAPS™ Unit is a rugged, compact, portable, easy-to-use, multi-energy (electric, gas, and water) meter reading unit that can be securely placed in the passenger seat of any vehicle with a standard seat belt while being powered by the cigarette lighter receptacle.

The RoadMAPS Unit provides the meter reading industry with many advantages over current meter reading methods:

- Improved meter reading accuracy
- Addresses “hard-to-read” meters
- Reduced man-hours needed to collect readings
- Suitable for any size utility
- Portable and easy to set up

System Operations

From the utility billing system, operators use RouteMAPS™ or EZ RouteMAPS™ host software to make route assignments for meter readers via the PC memory cards. Each meter reader inserts a PC memory card into the RoadMAPS Unit and then drives through the routes assigned to collect data broadcast by R900, R100, R200, R300, or ERT Meter Interface Units (MIUs). The data is stored on the memory card. When finished, the meter readers return the PC memory cards so the read data can be uploaded to the host software. The host software transfers the customer information to the billing computer to generate customer bills (See Figure 1.1).

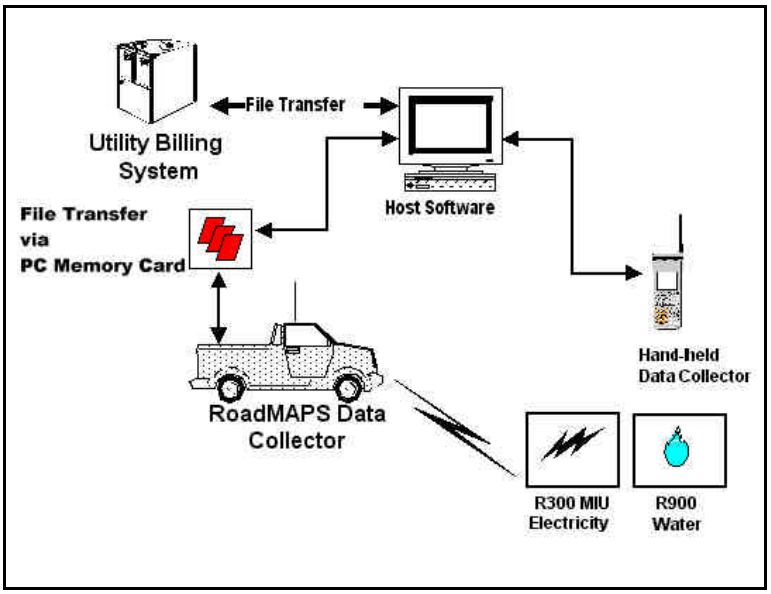

Figure 1.1 RoadMAPS Meter Reading Operations

About this Manual

The *RoadMAPS User's Manual* describes the system and its features and provides procedures on how to use the RoadMAPS Unit from setting up the unit and using its software to exiting and closing up the unit.

Throughout this manual, the Personal Portable Computer (PPC), a component of the RoadMAPS unit, is referred to as the laptop computer. In addition, the PCMCIA card used with the RoadMAPS unit is called the PC memory card. In addition to this introduction, this manual contains the following chapters:

Chapter	Title	Description
2	RoadMAPS Overview	Provides an overview of the RoadMAPS unit and software, including a description of function keys, screens, and RoadMAPS hardware.

Chapter	Title	Description
3	Setting Up the RoadMAPS Unit	Describes hardware setup instructions, power and antenna connection, and instructions on how to turn on the laptop computer. The chapter also includes information on how to adjust system settings including keyboard backlighting, display intensity, and the beeper settings.
4	Using the RoadMAPS Unit	Explains how the product works, procedures for reading meters, reviewing account information, reading missed meters, and exiting RoadMAPS.
5	Closing the RoadMAPS Unit	Provides a procedure for closing the RoadMAPS Unit.
Appendix A	Specifications	Provides a reference section containing product specifications.
Appendix B	Troubleshooting	Provides diagnostics procedures for troubleshooting RoadMAPS problems.

Conventions Used in This Manual

This manual uses the following icons and typographical conventions to identify special information.

The Warning icon identifies actions that can injure the user or permanently damage the product.

The Caution icon identifies important information that is critical to ensuring that data stored with the RoadMAPS Unit is not lost.

	The Note icon identifies information that clarifies a point within the text.
All small caps	Refers to keys. Examples: ENTER, ALT, TAB
All bold initial caps	Refers to field names, menus, buttons, and menu options. Example: **Device** field or **File** menu.
+ between keys	Refers to pressing the keys at the same time. Example: ALT+B

Product Support Within the United States

Schlumberger offers you different ways to obtain high-quality, responsive technical support. However, before contacting Schlumberger, it is important that you know the version number of the software that your RoadMAPS Unit uses. This information is useful to the support technical who helps you.

To find the version number of RoadMAPS Software, you must display the RoadMAPS System Check screen. For instructions on obtaining the version number of the RoadMAPS software, see “Performing Diagnostics,” on Page B-2.

Contacting technical support

Within the United States, Schlumberger technical support is available Monday through Friday, 8:00 AM to 7:00 PM Eastern Standard Time by telephone or fax. Whichever method you use to contact technical support, be prepared to give the following information:

- The exact wording of any message that appeared in the display of the RoadMAPS Unit
- A description of what happened and what you were doing when the problem occurred
- A description of how you tried to solve the problem
- Your company’s personal identification number (PIN)

Chapter 2 RoadMAPS Overview

The RoadMAPS Unit is a portable, mobile data collector used in conjunction with internal software and host software to provide automatic meter reading for collection of route information to be used in the utility's billing system.

RoadMAPS features the following:

- Durable carrying case designed for easy set-up and use in any vehicle
- A spill-proof membrane keyboard
- A touch screen display to allow for easy navigation and option selection
- A light sensor to adjust screen intensity to ambient light
- A beeper to indicate successful readings
- Direct launching of RoadMAPS software when the laptop is turned on, preventing meter readers from running other programs within the Windows® environment during meter reading operations
- Automatic exchange of route data between the RoadMAPS laptop and PC memory cards so that the user does not have to upload or download routes and accounts
- Ability to receive SURF and ITRON messages simultaneously, and at the same time transmit wake up signals for ERTs, R200, and R100 devices.
- Storage of received data in nonvolatile memory.

RoadMAPS Features

RoadMAPS consists of a data collection unit and laptop computer in a portable case designed for easy set-up and use in meter reading (see Figure 2.1). The unit features RoadMAPS meter reading software designed for simplified route information and data gathering.

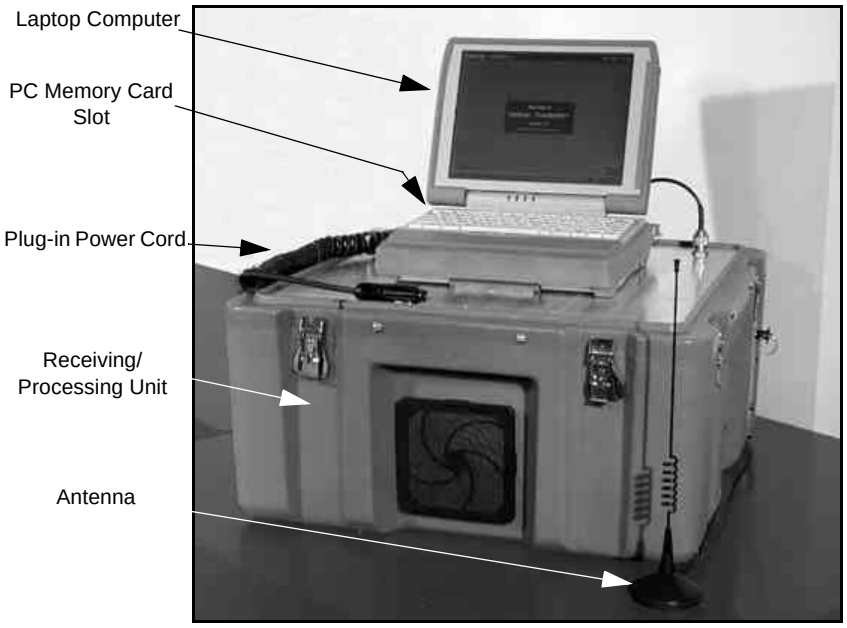

Figure 2.1 RoadMAPS Unit

Do not attempt to open the bottom of the RoadMAPS Unit carrying case. Attempting to repair or modify the unit on your own can result in personal injury or damage to the unit.

The Laptop

The PPC, the laptop computer on the RoadMAPS Unit as shown in Figure 2.2, is a part of the overall RoadMAPS data collector. It communicates with the receiver through a serial link at 38.8 Kbps using the RoadMAPS software, which decodes and records the messages detected by the receiver.

Figure 2.2 Laptop

To protect the safety of the driver collecting readings, the laptop computer provides an audible indicator option that can be turned on or off as required. For more information, see “Beeper Settings,” on page 4-6. The unit beeps each time an MIU signal is received by the receiver, excluding duplicate signals that are filtered out.

To protect the driver’s safety, use the Beeper function on the RoadMAPS Unit to monitor meter reading.

The laptop computer retrieves meter readings from the receiver in real-time, stores them in nonvolatile memory, and checks reading completeness against route files downloaded from the host software. The data retrieved is used to display the route reading status in a message line and graphic progress bar typically one second after the reading is received.

PC Memory Card Port

The PC memory card port, shown in Figure 2.3, is located on the side of the RoadMAPS laptop unit. It includes two memory card slots. You may use either slot for meter reading, but do not use both slots at the same time.

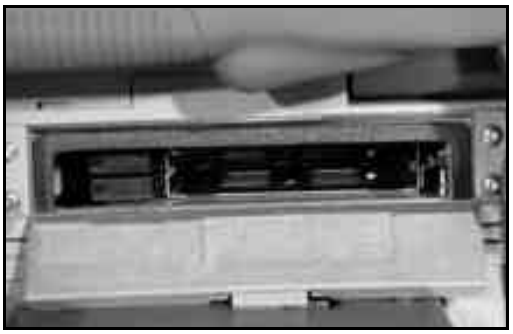

Figure 2.3 Memory Card Port

The RoadMAPS Unit requires that you have only one PC memory card in a slot at a time. To avoid losing metered data, do not put PC memory cards in both slots of the PC memory card port at the same time.

Navigation

All RoadMAPS functions are performed in one of two ways:

- Using the TAB Tab key or the arrow Home End PgDn PgUp keys to move the focus to the appropriate button and pressing ENTER.
- Using the provided stylus to touch the selections on the screen.

Always use the stylus provided with the laptop to touch the screen. Substituting a hard or sharp item could damage the screen.

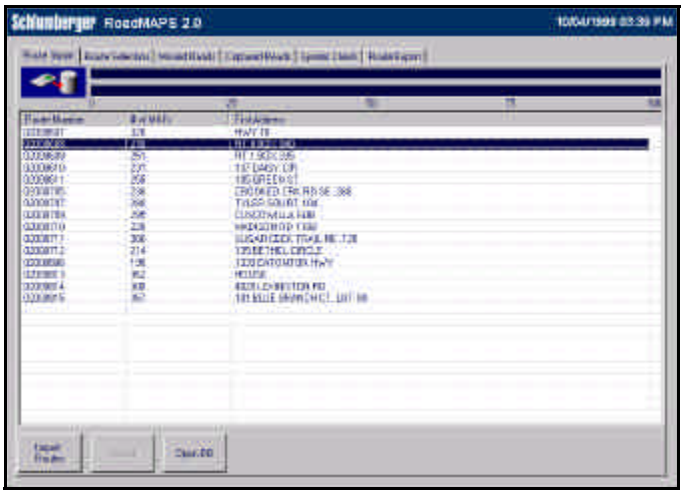

Figure 2.4 Navigating Within RoadMAPS

For example, Figure 2.4 shows the Route Import screen with Route 02000608 highlighted. Any field, or area of a field, on the screen can be selected by touching that area with the stylus, or by doing the following:

- Press  PgUp to move the focus to the previous item within the field, in this case Route 02000607.
- Press  PgDn to move the focus to the next item within the field, in this case Route 02000609.
- Press TAB to move the focus to the next field, in this case, the **Import Routes** button.
- Press SHIFT + TAB to move the focus to the previous field, in this case, the **Open DB** button.
- Press CTRL + TAB to move to the next screen, in this case the Route Selection screen.

RoadMAPS Software

The RoadMAPS software application runs on the laptop computer that is part of the RoadMAPS Unit. The purpose of the RoadMAPS software is to log meter data from routes of possible meter IDs. Messages from metered IDs outside of the route are identified as such and are discarded. RoadMAPS also provides a visual interface for the operator to see the progress in reading meters on the route.

Although the RoadMAPS software can start and stop the recording of message data, it does not control the receive frequency or the decoding of message data. Instead, the RoadMAPS Unit contains a receiving/processing unit that collects data from R900, R100, R200, R300, or ERT MIUs.

The file transfer between the host software and the RoadMAPS Unit is via PC memory cards that store routes and accounts. The file transfer between the host software and the utility company billing system is in a file format specific to the utility.

RoadMAPS Display

Information in the display of RoadMAPS software is shown on an 800 x 600 pixel screen.

RoadMAPS Function Buttons

Each RoadMAPS screen contains different function buttons pertaintaining to the specific information on that screen. Use the following to identify the different buttons and their specific operations.

Welcome Screen

- 

—automatically launches the route import process.
- 

—closes the RoadMAPS program.

Route Import Screen

- 

—manually launches the route import process.
- 

—stops the import route process.
- 

—opens a dialog box that allows the user to open a specific database

Route Selection Screen

- 

—initiates the route reading process
- 

—temporarily pauses the reading process
- 

—closes the Route Selection screen and returns the user to the Welcome screen

Missed Reads Screen

- MIU Details—opens a dialog box that provides the user with various details about the selected account, including the meter number, the type of MIU, the collection method,and the account name.

- Refresh—returns the user to the first account in the selected route

Captured Reads Screen

- MIU Details—opens a dialog box that provides the user with various details about the selected account, including the meter number, the type of MIU, the collection method,and the account name.

- Refresh—returns the user to the first account in the selected route

Route Export Screen

- Export Routes—launches the export of the loaded routes.

- Exit Route Reading—closes the Route Selection screen and returns the user to the Welcome screen

Reading indicator

The Reading indicator shows the activity status of the RoadMAPS unit. When the Route Selection screen is first accessed, the Reading indicator displays a “Stopped” message to show that reading has not yet begun.

To initiate the route reading, select the **Read Route** Read Route button. The Reading indicator will now display a pulsing arrow with a “Reading” message, indicating the RoadMAPS receiver is reading and storing meter reading data.

If the Reading arrow is not pulsing, the PC may be working on new reads. Wait a few seconds. If for any reason no read data is received for a period longer than five seconds, the Automatic Reading indicator stops pulsing.

Once you begin reading meters, the **Read Route** button changes to the **Pause Route** Pause Route button. Selecting this button temporarily stops the reading process, and the Reading indicator displays a “Paused” message. When reactivated, RoadMAPS will resume reading at the point where it previously stopped.

Message area and progress bar

The message area on RoadMAPS screens indicates the number and percentage of meters on the route that were read successfully. A graphical progress bar also shows the percentage of the route that is complete. Before meter reading begins, no accounts are reported as read and the progress bar is blank.

When all readings are complete, the last route is listed on the progress bar with the percentage complete. Usually, you can tell if a meter is missed because, although addresses on the current route or other routes continue to be read, the route does not progress to a read status of 100%.

Information area

The information area of a RoadMAPS screen displays the route or addresses to be read. These following views are available:

- The route view includes the route number, number of MIUs to be read, first address on the route, and percentage of the route that was read.
- The account view provides a listing of the addresses and MIU IDs to be read for a specific route. If you display account detail, the information area displays information for the selected account.
- A meter reading and loading indicator area with a graphic progress bar and pulsing reading indicator
- A message and information display area
- An active function key display bar

The progress bar and automatic reader indicator are not displayed at RoadMAPS start up while the routes are being loaded. Although all three screen areas are not used on every RoadMAPS screen, the active function key display bar is available throughout the RoadMAPS system.

Route Selection Screen

The first type of RoadMAPS display screen is the Route Selection screen shown in Figure 2.5. This screen shows loaded routes and the percentage of each route that has been read. The screen includes the Reading indicator, an information area with a list of routes, and a selection box that allows you to turn the beeper on or off.

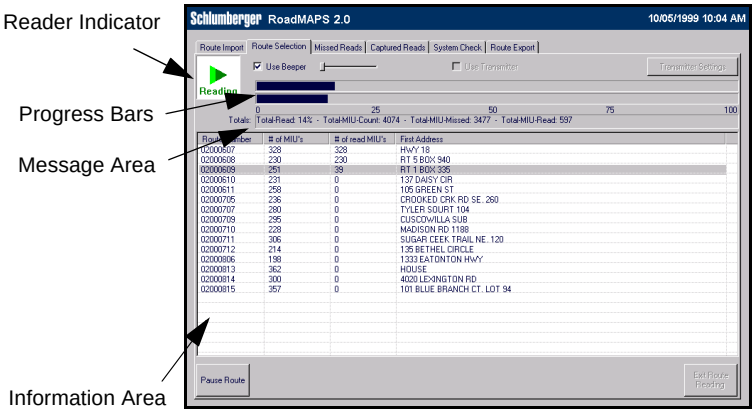

Figure 2.5 Route Selection screen

Route Display Screens

There are two screens, the Missed Reads screen and the Captured Reads screen (Figure 2.6), that provide information for a selected route. Both of these screens have a message area for the selected route with the total number and of meters on the route, the number that were read successfully, and the number that were missed. The Missed Reads screen also has a graphical progress bar that shows the percentage of the route that is complete.

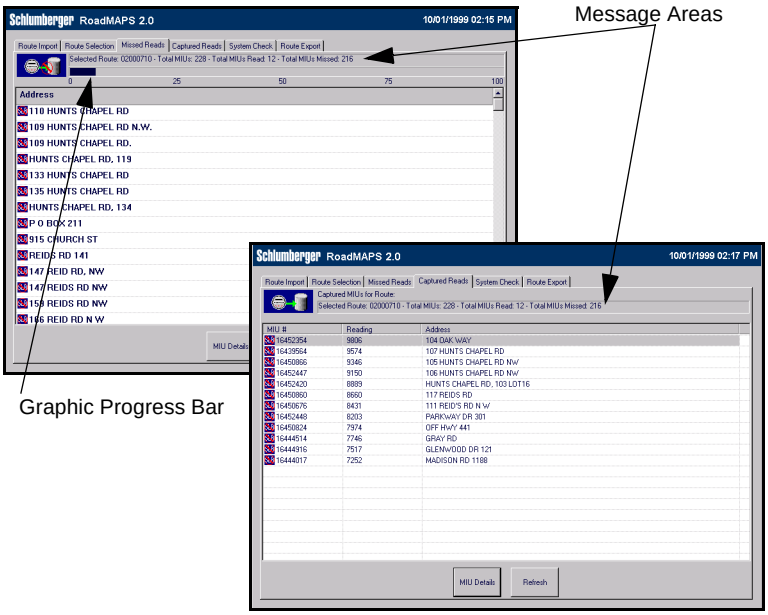

Figure 2.6 Missed Reads and Captured Reads Screens

It is possible to view the d[↑]ls of a spe[↓] MIU from either screen.

1 Select the specific MIU by touching the screen with the stylus or by using the PgUp or the PgDn keys.

2 Press the **MIU Details** [MIU Details] button.

The MIU Details dialog box (Figure 2.7) appears.

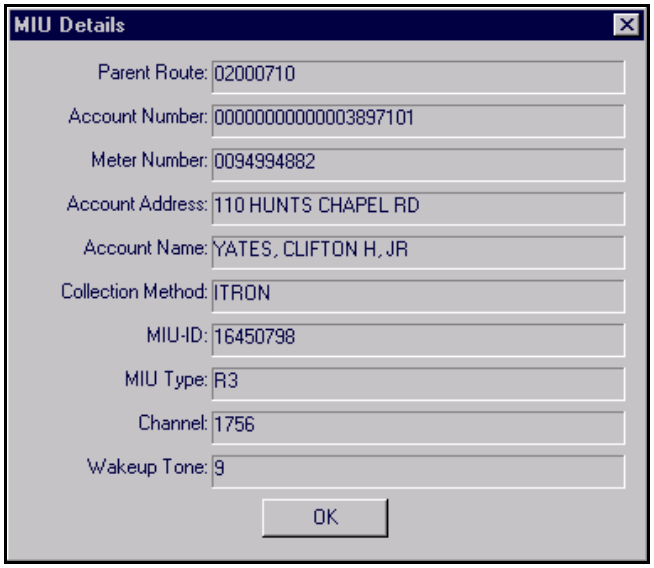

Figure 2.7 MIU Details Dialog Box

RoadMAPS Unit

The RoadMAPS Unit, shown in Figure 2.8, consists of two sub-systems: an RF (Radio Frequency) receiver and an RF transmitter. The RF receiver is made up of the following 3 modules:

- RF (Radio Frequency) Front End
- Digital Multi-channel Receiver (DMR)
- CPU (based on a PC104 board)

The RF transmitter is made up of the following 2 modules:

- Logic Control
- Transmitter

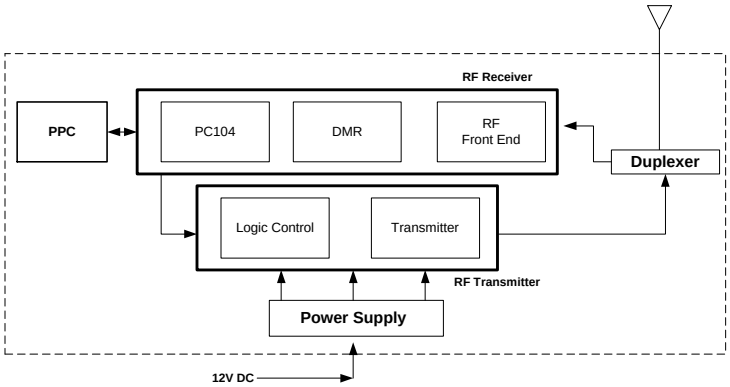

Figure 2.8 RoadMAPS Unit Diagram

RF Receiver

Radio Frequency (RF) Front End

The RF front end module receives the 915 MHz receiving band from the antenna through the duplexer. The duplexer functions as a translator, ensuring that the receiving band is passed from the antenna to the RF receiver. The RF front end module then translates the RF spectrum from the 915 MHz band down to a 41 MHz band.

Digital Multi-channel Receiver (DMR)

The DMR module receives and decodes the bands from the RF front end module to determine if the signals are from an RF module that uses the SURF protocol (R900) or an RF module that uses an ITRON protocol (R100, R200, R300, ERTs). Samples from up to 8 identified frequencies are processed to obtain the data signals. The signals are compared to a profile, and if there is a match, the signal is processed to extract and validate the data within it. The extracted data is stored in local cache memory.

The RoadMAPS Unit reads signals from R900 water MIUs and R100, R200,R300, and ERT gas and electric MIUs with a high rate of success on the first pass. Inbound meter readings are collected

and stored into memory. The receiver processes only signals received from these MIUs and ignores readings from MIUs on routes that are not currently being read.

The receiver filters out duplicates in order to keep the best or last reading received. This optimizes memory storage space. Records for each reading are stored in the receiver database to eliminate duplicates and keep track of reading data.

The DMR processes 10 MHz of band with a full 128-channel receiver, of which only 77 channels are available, and extracts messages which are sent to the CPU. The DMR will receive and demoduleat up to eight simultaneous SURF messages and up to eight simultaneous Itron messages, provided they are not transmitted in the same RF channel. The RoadMAPS Unit together with the MIU functions as a transmitter/receiver pair that works together as a spread spectrum system.

In addition to handling these spread spectrum functional requirements, the receiver can synchronize with multiple transmitters at the same time and maintain reliable data transmissions for every transmitter.

Central Processing Unit (CPU)

The Central Processing Unit (CPU) is based on a PC104 board. It receives the messages obtained from the band by the DMR module through the PC104 (ISA) bus. It then extracts the data and uses an RS-232 serial link to transfer it to the Portable Personal Computer (PPC). The CPU also uses an RS-232 serial link to program the RF transmitter with the data received from the PPC.

The CPU will temporarily store received data, and will download a configuration to the DMR module. It also sets the DMR parameters, automatically tests the DMR board, and resets the parameters.

RF Transmitter

Logic Control

The logic control module takes the information gathered from the PPC through the CPU and sets the operating transmit frequency and the required tone for that information. It also monitors the unit temperature and will stop the operation of the unit if the temperature falls outside the specified temperature range, not to exceed 70°C. This will limit the operation of the unit to about 50°C ambient termperature.

The logic control also generates the modulating waveform for use by the transmitter module. The modulatig tones will be chosen from 15 frequancies between 24 Hz and 58 Hz.

Transmitter

The transmitter module generates a frequency and applies the modulating waveform created by the logic control module. It then amplifies the signal with a modulation index greater than 99%. The RF energy, up to 10W of RF power, is sent to the antenna through the duplexer. As with the RF receiver, the duplexer ensures that the transmitting signal is passed from the RF transmitter to the antenna.

The RF transmitter is, by default, inactive. It will operate on any one of 1760 RF channels between 951 MHz and 962 MHz with 6.25 kHz channel spacing and, once actiated, will be used to continuously send a wakeup/alert tone to the R100 and R200 MIUs or the ITRON ERTs. The RF frequency and the alert tone frequency will both be programmed from the PPC.

Power Supply

The RoadMAPS Unit is powered by a 12V automobile battery, but both the RF receiver and the RF transmitter are supplied power from that battery through independent paths. Refer to the following table for the different operating voltages and current levels.

Table 2.1 Operating Voltage and Current

Component	Operating Voltage	Operating Current
PPC	12V	1.5A
CPU	5V	2A
DMR—without ADC with ADC	3.3V 5V	2.5A 250 mA
RF Front End	12V	300mA
TX control board/modulator	5V	230mA
Transmitter driver	12V	140mA
Transmitter Power Amplifier	28V	4A
Fans (x2)	12V	400mA

When components require more than 12 volts, additional voltage will be generated using DC/DC converters; when components require less than 12 volts, linear regulators will be used.

To prevent excessive use of the battery, the RoadMAPS unit will not operated if the vehicle's engine to which it is connected is not running.

The power supply system has fuses and switches to control, protect, and limit its operation. In particular, the following sections will have a shut-off pin:

- Transmitter Power Amplifier
- RF transmitter control board
- All RF receiver supply sections

Antenna and Duplexer

The RoadMAPS antenna, used for both transmission and reception, is connected to both the RF receiver and the RF transmitter subsystems by way of the duplexer, and performs at an operating temperature from -40° C to +85° C.

The antenna is made of a corrosion-free material that is tolerant to ultra-violet exposure. It has a magnetic base and is capable of staying in place at speeds of up to 70 m.p.h.

While the antenna is designed to stay in place at speeds of up to 70 m.p.h., the system is only capable of taking reads in a drive-by mode of up to 30 m.p.h.

The antenna is stored in the RoadMAPS Unit carrying case when not in use.

The antenna will provide nominally 6 dB of gain in the horizontal plane and will have a cable of optimized length between the RoadMAPS unit (duplexer/lightening arrestor) and the antenna itself. The antenna cable will be terminated with an N-type connector. The return loss at the end of the cable will be below -15 dB at both transmitting band and the receiving band. The lightening arrestor will not introduce more than 0.2 dB losses in any of the operating bands.

The duplexer, as explained previously, ensures that the receiving band is passed from the antenna to the RF receiver and the transmitting signal is passed from the RF transmitter to the antenna. It is also the sybsystem that provides the separation between the RF receiver and the RF transmitter, allowing the two to operate simultaneously. The duplexer is designed to be a high quality, low insertion loss, high attenuation device. In the following paragraph, the term “band” refers to 910-920 MHz in receive mode and 951-962 MHz in transmit mode.

The duplexer’s insertion losses in the 915 MHz band or the 956 MHz band will be no more than 0.5dB. The attenuation of the transmitting band at the RF receiver’s input will be a minimum of 60dB, and the return losses in any of the 3 RF ports will be below -15dB.

Chapter 3 Setting Up the RoadMAPS Unit

This section provides basic instructions for setting up the RoadMAPS unit so it can be used to perform mobile meter reading and exchange information with the host computer.

Schlumberger recommends that you insert the PC memory card into the laptop before you place the unit in the vehicle.

Removing Carrying Case Cover

To set up the RoadMAPS Unit in a vehicle, you must remove the top cover by opening four latches on the cover.

For safety purposes and to prevent damage to the cover, make sure the cover is securely stored in the back seat or elsewhere in the vehicle.

To remove the carrying case cover

Follow this procedure to open the RoadMAPS unit latches, shown in Figure 3.1, and remove the carrying case top.

1 Lift the latch flap and turn it to the left.

The latch releases from the catch on the carrying case top.

2 Press the latch and down against the Velcro strip on the the unit base.

Figure 3.1 Latches on RoadMAPS carrying case

3 Remove the RoadMAPS carrying case top that covers the laptop computer.

4 Make sure the cover is secured in the back seat or elsewhere in the vehicle.

Inserting the PC Memory Card

For easier access to the PC memory card port, insert the PC memory card into the slot in the laptop before you place the RoadMAPS Unit in the vehicle.

The laptop must be OFF before you insert the PC memory card.

Follow this procedure to insert the PC memory card containing the routes you will read.

1 Locate the PC memory card for your assigned routes.

2 If the PC memory card port is closed, use both hands to open the door located on the center right side of the laptop computer.

3 Insert the PC memory card into the PC memory port as shown in Figure 3.2. You can choose either of the two slots in the port.

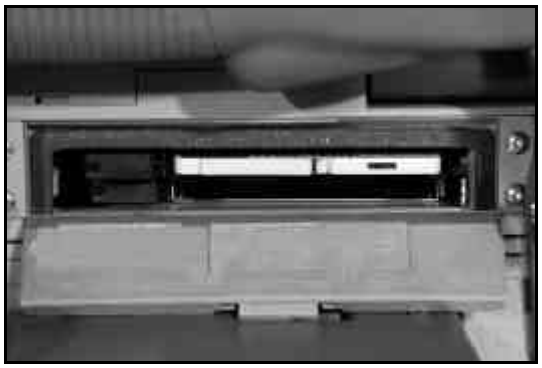

Figure 3.2 PC memory card slot

To avoid losing metered data, **do not** put PC memory cards in both slots at the same time!

Placing the RoadMAPS Unit in the Vehicle

Follow this procedure to set up the RoadMAPS Unit in the vehicle passenger seat.

Never set up a RoadMAPS Unit during a lightning storm or under excessively wet conditions.

1 Place the RoadMAPS Unit in the passenger seat with the seatbelt retention loop facing the back of the seat.

2 Press the blue button on the safety pin, and pull the pin out of the seatbelt retention loop. (See Figure 3.3)

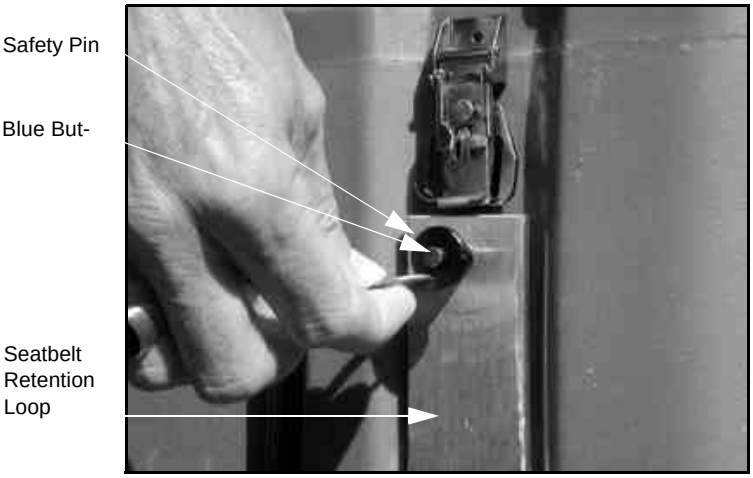

Figure 3.3 Removing the Safety Latch

3 Guide the seat belt through the seat belt retention loop, as shown in Figure 3.4.

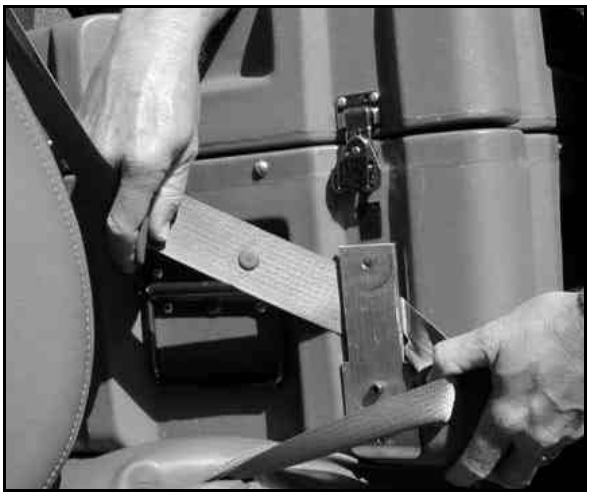

Figure 3.4 Placing Seatbelt in Retention Loop

4 Replace the safety pin in the seatbelt retention loop, as shown in Figure 3.5.

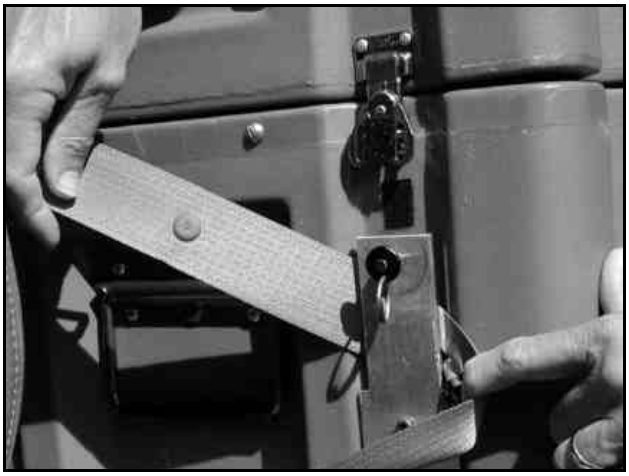

Figure 3.5 Replacing the Safety Pin

5 Adjust the seat belt so that the unit is secure in the passenger's seat.

6 To further secure the unit, slide it against the back of the seat (see Figure 3.6).

Figure 3.6 Securing the unit

Connecting the Antenna

Follow this procedure to connect the antenna cable and place it on the roof of the vehicle.

1 Remove the Velcro® strapping that holds the antenna cable and plug-in power cable (see Figure 3.7).

Figure 3.7 Cables retained by Velcro strapping

2 If the antenna cable is not plugged in, plug it into the socket on the top right side of the RoadMAPS Unit next to the laptop computer.

3 Twist the antenna connector to the RoadMAPS Unit.

4 Route the antenna wire through the passenger window as shown in Figure 3.8.

Figure 3.8 Antenna routing

5 Place the magnetic base of the antenna in the center of the roof approximately one foot behind the leading edge of the roof (see Figure 3.9).

Figure 3.9 Antenna placement

Plugging in the Power Cable

Follow this procedure to connect the cigarette lighter power cable to the RoadMAPS Unit and plug it into the lighter receptacle.

1 Insert one end of the cigarette lighter power cable into the connector on the RoadMAPS Unit.

2 Plug the other end of the power cable into the cigarette lighter receptacle as illustrated in Figure 3.10.

When you insert the cigarette lighter power cable, make sure the red LED is in view to help verify that power is supplied to the RoadMAPS Unit.

Figure 3.10 Cigarette lighter power cable

Turning the Unit On

When the laptop starts up, RoadMAPS software loads route data from the PC memory card.

After the route data is loaded, RoadMAPS performs a system self test. During the self test, RoadMAPS also removes the old export file from the PC memory card after verifying that the previous data upload to the host was successful.

To start RoadMAPS Software

Follow this procedure to turn on the RoadMAPS laptop and software and automatically load routes from the PC memory card.

1 With the laptop computer facing you, press the latch in to disengage the locking mechanism located on the front center edge of the display.

2 Raise the display to a comfortable viewing position with the keyboard accessible to you.

3 Press FN + ON and hold it for one second. The the FN key is located on the bottom row in the lower left corner of the keyboard, and the ON key is located on the space bar. (See Figure 3.11).

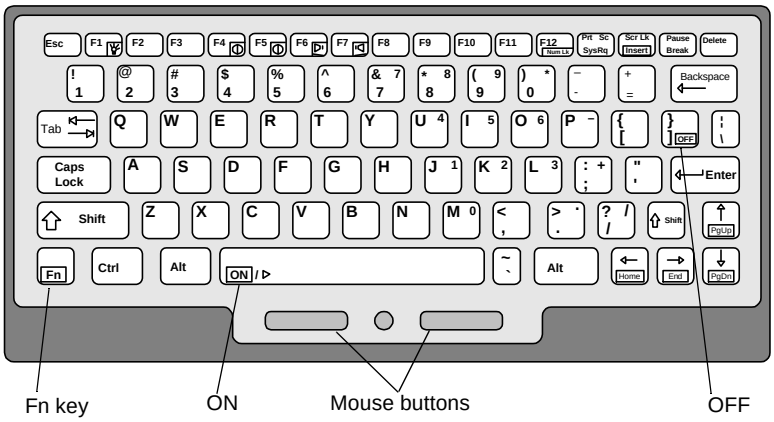

Figure 3.11 Laptop Keys

When the laptop starts up, RoadMAPS software automatically loads route data from the PC memory card.

If the computer does not start up, press and hold both mouse buttons (Figure 3.11) for at least 10 seconds. Release the buttons to restart the comptuer.

After the route data is loaded, RoadMAPS performs a system self test. For more information on RoadMAPS self-diagnostics, see “Performing Diagnostics.” on page B-2.

If No Route Data File is Found

If the PC memory card is not inserted in the card slot in the laptop computer when the RoadMAPS Unit starts up, the following screen appears with a warning message indicating that an import file was not found (see Figure 3.12).

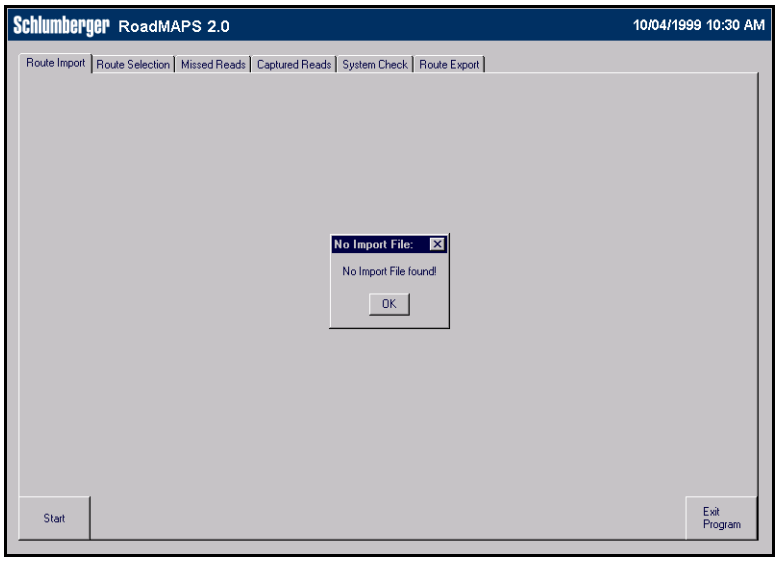

Figure 3.12 Error Message on start up

To correct this error and load the import file, do either of the following:

- Insert the PC memory card, press **OK**, and then press the START  button to try to load the route data again.

- Press the  to close the dialog box, and press the EXIT PROGRAM  button to exit from RoadMAPS Software.

Adjusting System Settings

This section describes several settings you can make to the RoadMAPS Unit to make it easier and more comfortable to use.

Backlight

The laptop has a backlighted display to make the user interface easier to read. The laptops that come equipped with color monitors, automatically use the backlight function whenever the unit it on. However, to increase the display backlight, the user has the option of activating the MaxBright feature.

- When MaxBright is inactive, press FN + F1 to activate the feature.

- When MaxBright is active, press FN + F1 to deactivate the feature.

Contrast

The user can also adjust the contrast of the laptop display:

- FN + F4—lightens the display.

- FN + F5—darkens the display.

Chapter 4 Using the RoadMAPS Unit

Using the RoadMAPS Unit to collect readings begins with the host software building a route file that is transferred to the RoadMAPS Unit via the PC memory card. The meter reader loads the memory card in the RoadMAPS Unit and begins automatic meter reading by driving the vehicle through the route and collecting readings. After the readings are complete, the meter reader returns to the utility, shuts down the RoadMAPS Unit, and removes the PC memory card to give it to the host computer operator. The host computer operator transfers the data from the PC memory card to the host computer software and transfers the data to the utility billing system computer.

Route File Generation

Route file generation is performed on the Host software, as illustrated in Figure 4.1.

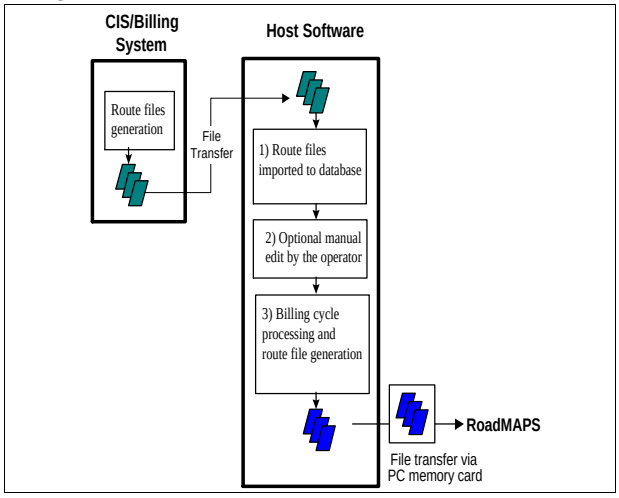

Figure 4.1 Host File Transfer to RoadMAPS

Through the host software user interface, users import route files from the CIS/Billing system into the Host database. In addition to importing files, the host software permits manual database entry to permit an operator to type or edit route information.

The host software processes route information according to the utility billing cycle and generates route files for meter reading. The last step is to transfer those files to RoadMAPS by copying the files onto PC memory cards. For information on Host software processing, see the *RouteMAPS Software User's Manual* or *EZ RouteMAPS Host Software User's Manual*.

Off-site meter reading

The meter reader inserts the PC memory card and sets up the RoadMAPS Unit in a vehicle. At power-up, the RoadMAPS laptop computer reads route files from the PC memory card, loads them into its database, and runs self diagnostics on the RoadMAPS system.

After the self-diagnostics sequence, RoadMAPS is ready for the meter reader to start collecting readings. Figure 4.2 illustrates the collection process.

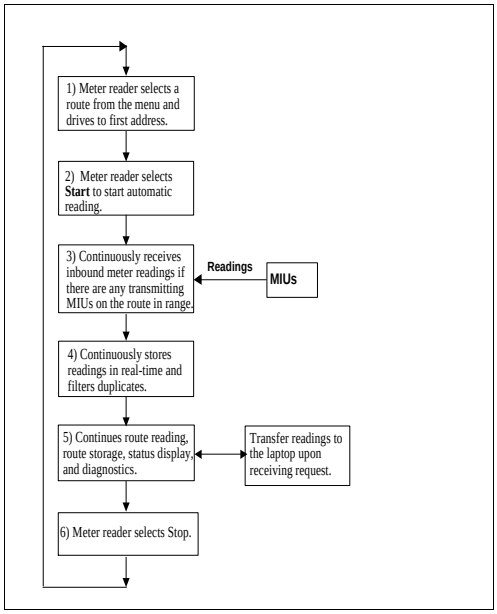

Figure 4.2 RoadMAPS Automatic Meter Reading

At any point in the automatic read mode, the meter reader can selectively check the route status or the meter reading of an individual account.

With the software performing the reading, the meter reader can make the following decisions:

- Select the route to view from the menu and drive to that route.
- Go back to a route if there are significant missed readings after the first pass and reread the route.
- Terminate reading operations at any time by selecting Exit Program.

File Transfer to Host and Billing System

After the meter reader returns the PC memory cards containing the collected data to the utility, the operator transfers the information to the host software and then on to the utility company billing system. The operator loads the files from the PC memory cards and then performs a file transfer from the host software to the billing system (see Figure 4.3).

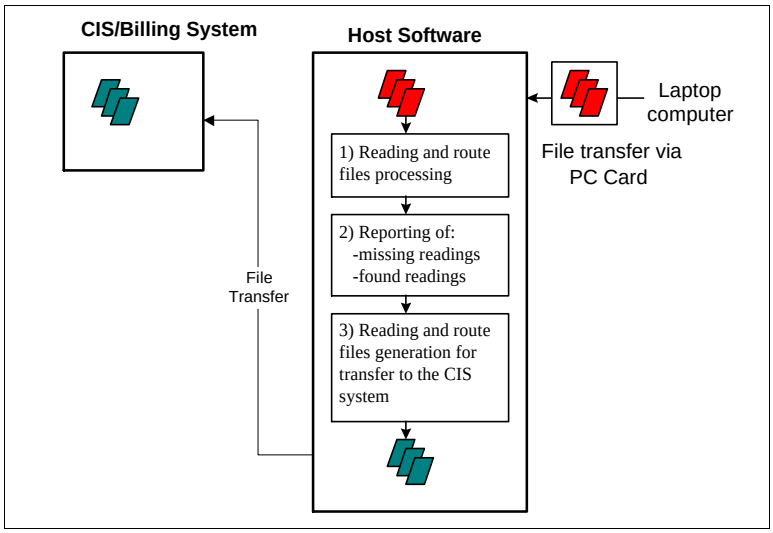

Figure 4.3 Reading File Transfer to Host

Using PC Memory Cards to Exchange Information

The process of transferring information to and from the host computer is performed at the host level. The only involvement by the meter reader in the process is to insert the PC memory card containing assigned routes into the RoadMAPS Unit before reading meters and then to remove the PC memory card to return it to the operator after reading meters. The meter reader performs no manual import or export procedures.

To exchange information with the host computer

Follow these procedures to transfer files from and to the host computer system.

1 Obtain the assigned PC memory card for the route you are reading.

2 Insert the PC memory card into the RoadMAPS laptop unit and start up the unit. See “To begin meter reading,” on page 4-12.

The routes loaded in the Host software are transferred into storage on the RoadMAPS unit.

3 Read all of the routes loaded from the assigned PC memory card.

4 Shut down the laptop computer. See “Exiting RoadMAPS Software,” on page 4-21.

5 To release the PC memory card, press the black button to the right of the PC memory card slot to release the card.

6 Remove the PC memory card and return it to the operator who will load the latest read data onto the host computer.

Reading Meters

Because RoadMAPS automatically reads meters, efficient use of the system depends on the distance of the RoadMAPS Unit from the MIU being read and the vehicle’s driving speed.

In a typical meter reading scenario, you drive your vehicle through the routes on the RoadMAPS selection screen in any order. You can position your vehicle at any route or starting address as required by driving conditions and route distribution for the most efficient data collection. The RoadMAPS Unit reads and stores readings regardless of the order of the routes displayed.

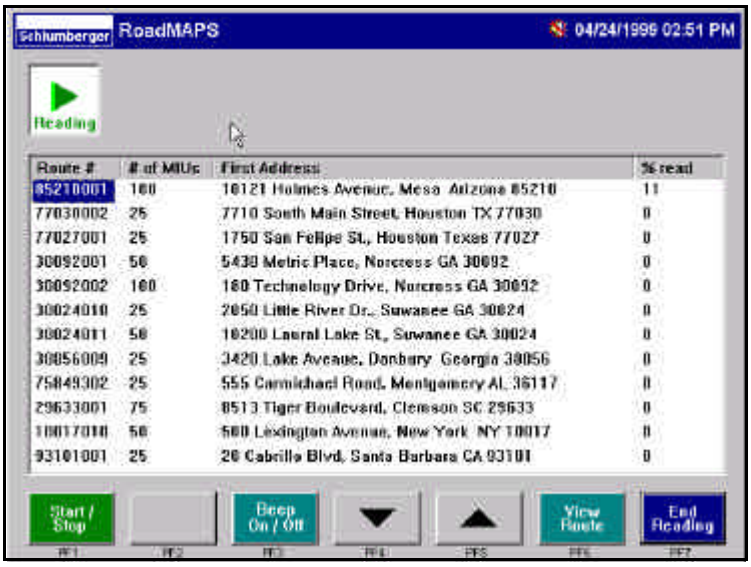

Figure 4.4 Route Display with multiple routes being read

When RoadMAPS starts collecting data, the red Stopped icon changes into a pulsing green Reading icon. This icon continues to pulse as long as read data is received within a period of five seconds.

In normal use, you focus on driving and listening for beeps. You do not need to look at the screen on the RoadMAPS Unit. RoadMAPS reads the next meter signal received from any route loaded on the PC memory card.

Beeper Settings

A beeper is available in the RoadMAPS Unit to emit a beep tone for every account that is read and stored in RoadMAPS. This helps to monitor RoadMAPS meter reading without having to look at the laptop display. This also offers a safe way to keep up with readings while driving a route.

The beeper only sounds while RoadMAPS is performing readings and stops when all readings are completed. You can turn the beeper function on or off while the unit is performing readings. The default setting in RoadMAPS is for the beep tone to be turned off.

To turn the beeper on or off

Follow this procedure to switch the RoadMAPS beeper on or off.

1 Access the Route Selection screen.

At the top of the screen, there is a **Use Beeper** field with a check box, as shown in Figure 4.5.

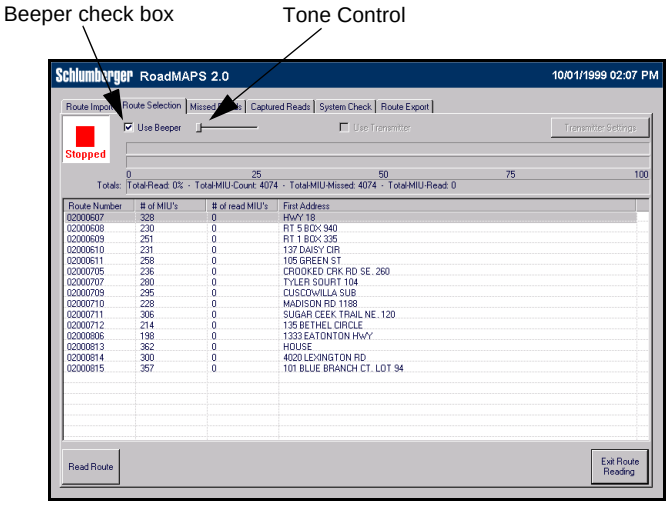

Figure 4.5 Use Beeper Field

2 Select the box using the stylus.

A check in the box indicates the beeper is on. An empty box indicates the beeper is off. The tone control shown in Figure 4.5 allows the user to adjust the tone of the beeper by sliding the control to the left for a lower tone or to the right for a higher tone.

Selecting Routes

This is an optional step if you want to review selected routes to determine a good starting point for reading.

1 Access the Route Selection screen, shown in Figure 4.6, by pressing the **Route Selection** tab.

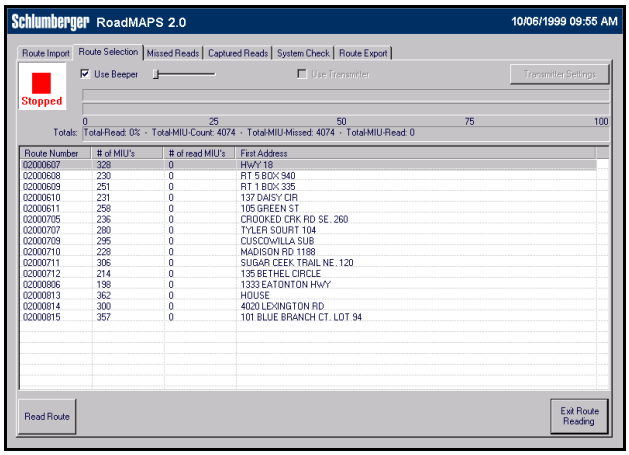

Figure 4.6 Route Selection Screen

2 Highlight the route to be viewed.

3 Select the **Missed Reads** tab to display the Missed Reads screen.

All accounts that are unread or missed during the reading process are displayed on the Missed Reads screen, as shown in Figure 4.7.

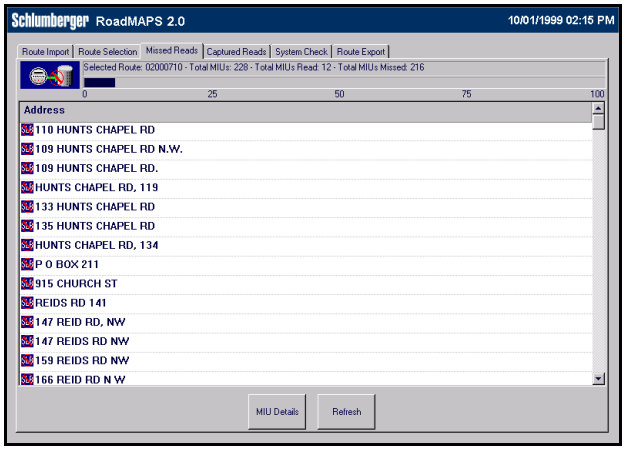

Figure 4.7 Missed Reads Screen

The Missed Read screen appears and displays the accounts in the route, with the first address in the route on the fist line.

4 If necessary, select another address for your starting point.

5 To get detailed information on an account, select that account and press the **MIU Details**  button.

The MIU Details dialog box, shown in Figure 4.8, appears.

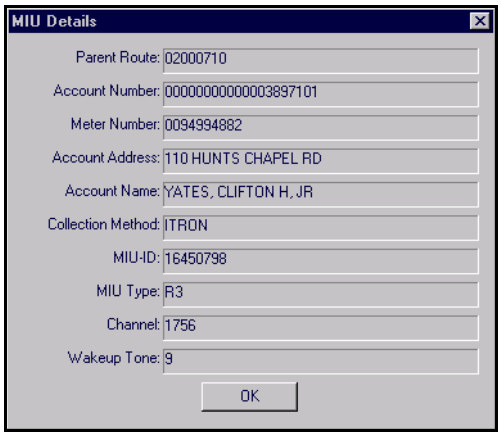

Figure 4.8 MIU Details Dialog Box

6 Go to the procedure "To begin meter reading," on page 4-12 to begin reading the route.

Detail Settings

When viewing route information in RoadMAPS, you can view the details of a specific account. Account details consist of the following:

- Parent Route
- Account Number
- Meter Number
- Account Address
- Account Name
- Collection Method
- MIU-ID
- MIU Type
- Channel
- Wakeup Tone

For more information see the next section, "To view account detail."

To view account detail

Follow this procedure to view account details for selected accounts.

1 From the Route Selection screen, highlight the route containing the account you want to view.

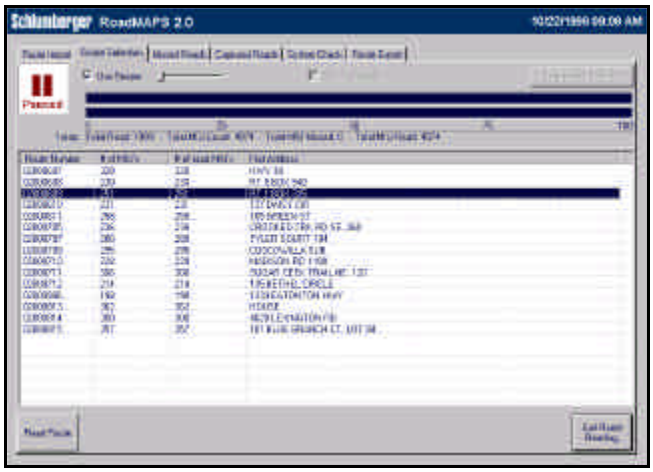

Figure 4.9 Route Selection Screen with Account Highlighted

2 Go to either the Missed Reads or Captured Reads screen, depending on whether or not account has already been read.

3 Highlight the specific account.

4 Press the **MIU Details**  button.

The MIU Details dialog box appears with the details of the selected account.

5 To close the MIU Details dialog box, select **OK**.

Collecting Readings

For the meter reader's safety, the RoadMAPS Unit is designed so that there is no requirement to use the laptop display and keyboard while driving. To verify that the unit is reading properly, use the beeper option to monitor readings.

On occasion, it may be necessary for the driver to stop and view routes and display account detail. If necessary, a meter reader can easily suspend meter reading and restart it before continuing on a route. See "Pausing and Restarting Meter Reading," on page 4-19.

To begin meter reading

Follow this procedure to begin collecting read data after you have positioned your vehicle at the starting address and started up the RoadMAPS laptop computer.

To read meters, the plug-in power cord on the RoadMAPS Unit must be connected to the cigarette lighter receptacle. Make sure the red LED is lit on the power cable.

1 From the RoadMAPS Welcome screen, press the **Start** 

button to load your routes.

2 Press the **Route Selection** tab to display the Route Selection screen.

3 Highlight the route where you will begin reading.

4 Press the **Read Route** 

button.

The Reading indicator turns on and pulses to indicate that reading is in progress. Addresses and routes that are successfully read are listed on the Captured Reads screen. Any remaining unread or

missed routes are listed on the Missed Reads screen. The Reading icon continues to pulse as long as read data is received within a period of five seconds.

5 Start driving your vehicle by each address along the route at a speed of no more than 30 m.p.h.

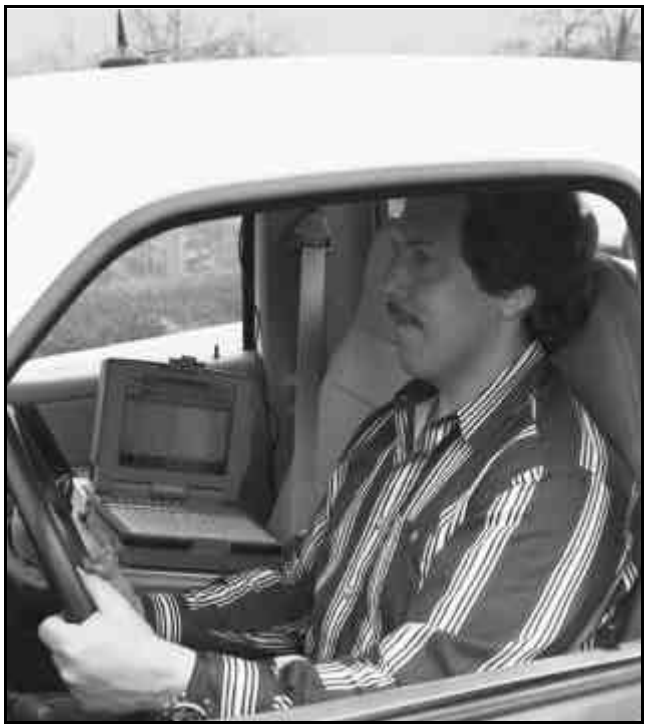

Figure 4.10 Meter Reading

Use the Beeper function on the RoadMAPS Unit to monitor meter reading while driving or in other situations where use of the laptop display or keyboard could compromise driver safety. See "To turn the beeper on or off," on page 4-7.

6 If the message area at the top of the Captured Reads screen indicates that all account on the route have been read, as shown in Figure 4.11, select the next route to be read.

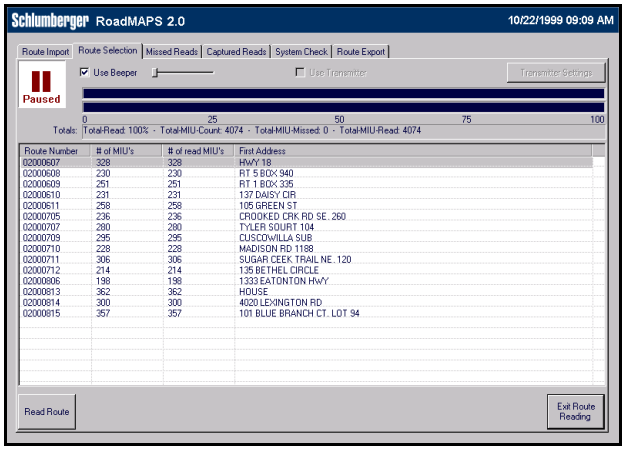

Figure 4.11 Route With All Reads Completed

The Reading indicator on the RoadMAPS screen pulses as you continue driving each route until all of the routes have been read. When reading is completed, check the Missed Reads screen to see if there are any missed accounts.

7 Choose from the following:

- To pause RoadMAPS meter reading before all routes have been read, see “Pausing and Restarting Meter Reading,” on page 4-19.
- To reread missed meters, see “Rereading Missed Accounts,” on page 4-19.
- To end meter reading and upload the read data to the Host software, see “Exiting RoadMAPS Software,” on page 4-21.

Navigation on the Route Display Screen

Before you complete readings for RoadMAPS routes, you can move between routes on the route display screen to select the route information you want to view. This also gives you access to route details and individual account information.

You can move between the routes whether or not RoadMAPS is actively reading meters.

- Touch the s n with the stylus to select the desired route.
- Press PgUp move backward through the route.
- Press PgDn to move forward through the route.

To view routes

Follow this procedure to select routes to display route reading progress and route detail. You can perform this procedure whether or not routes are actively being read.

1 Press the **Route Selection** tab to access the Route Selection screen.

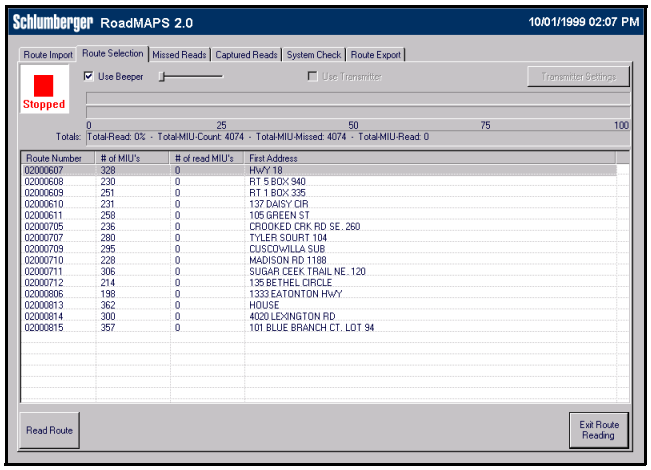

Figure 4.12 Route Selection Screen

2 Highlight the specific route you want to view.

The top graphical progress bar displays the percentage of the route that is complete.

3 Select the Missed Reads or Captured Reads screen. (See

Both screens display the individual accounts within the selected route. The message area at the top of the screen display the route number, total MIUs, total MIUs read, and total MIUs missed.

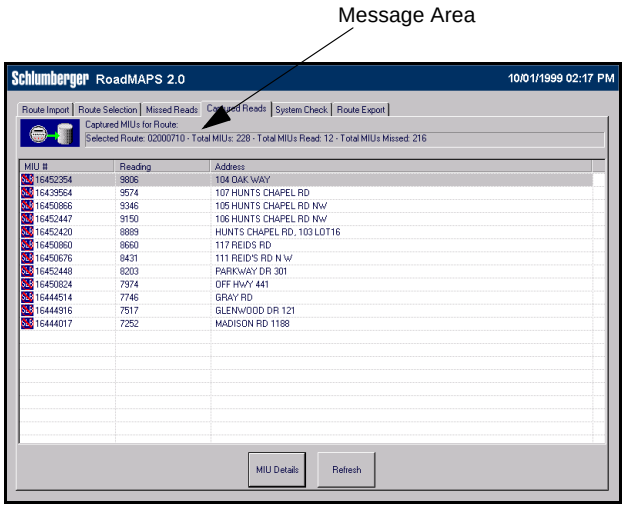

Figure 4.13 Captured Reads Screen Message Area

Identifying Missed Accounts

Occasionally, because of driving speed, RF interference, or problems with the MIUs, it is possible to miss a meter.

Usually, you can tell if meters are missed because the route does not progress to a read status of 100%. To view the missed accounts:

1 From the Route Selection screen, highlight the route containing the missed reads.

2 Press the **Missed Reads** tab to display the Missed Reads screen.

All missed accounts are listed in the information area of the screen.

To see the details of a specific account:

1 Highlight the account.

2 Press the **MIU Details** 

button.

The MIU Details dialog box () apears.

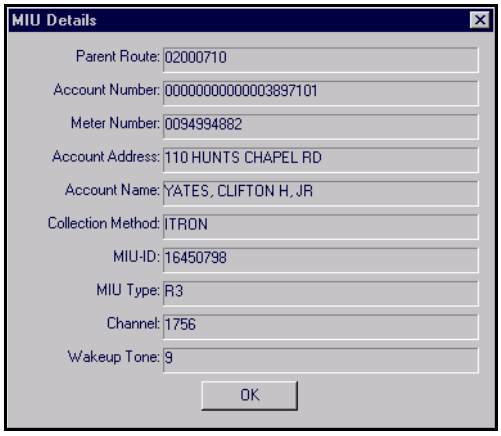

Figure 4.14 Viewing Details of an Account

3 Press **OK** to close the dialog box.

Viewing Account Details

Before reading begins, the Route Selection screen display zeros for all routes in the **# of read MIUs** field. Once reading is initiated, the captured reads for each route are recorded in this field

After meter reading is completed, only the missed or unread accounts remain on the Missed Reads screen. The meter reader then knows which addresses to reread.

If for any reason RoadMAPS is not able to read unread MIUs on the second attempt, the meter reader can select specific accounts and use MIU Details dialog box to display more information for the account.

To move from one account to the next

Before completing readings for the addresses in a route, you can move between accounts to select the account to display.

- Touch the s[↑]n with the stylus to select the desired account.
- Press PgUp [↓]ove backward through the route.
- Press PgDn to move forward through the route.

To display account detail

Follow this procedure to view route detail for selected routes.

1 From the Route Selection screen, highlight the appropriate account.

2 Select either the Missed Reads screen or the Captured Reads screen, depending on whether or not the account has been read.

3 Highlight a specific account.

4 Press the **MIU Details** MIU Details button.

The MIU Details dialog box (Figure 4.15) appears.

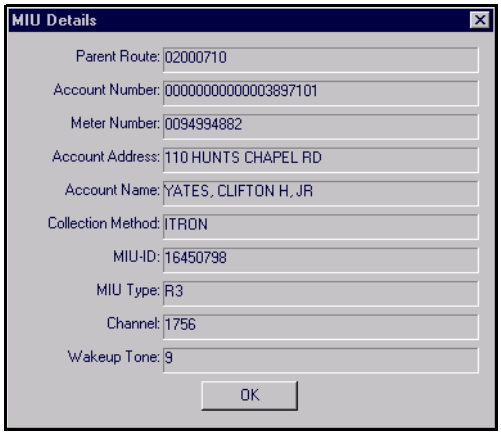

Figure 4.15 MIU Details Dialog Box

The collection method on the Account Detail screen is either R100, R200, R300, R900 or ERT. Route numbers usually derive from route numbers assigned at the time of previous meter reading routes, such as handheld meter reader routes.

Rereading Missed Accounts

The procedure for rereading missed accounts is similar to the procedure used on the initial reading. To assist in reading missed accounts, you may need to view route and account details to locate the exact starting point for reading. It might also be helpful to drive slower and get as close as possible to the missed meters to improve chances of receiving read data.

To identify a missed meter, select a route from the Route Selection screen that shows a read status of less than 100% in the progress bar at the top of the screen. Once selected, missed accounts from that route are shown on the Missed Reads screen.

If necessary, use the **MIU Detail** button for the missed account and determine if there are any problems with the account that prevent a successful reading. Note the address of any accounts for subsequent reading and reporting.

To reread a missed meter, drive to the first unread account address on the route and position your vehicle for meter reading. Reread the remaining accounts on the route.

If you do not succeed in reading an account after a second attempt, the account remains with a status of unread in the PC memory card to be returned to the utility. The company can initiate follow-up action to investigate the source of the reading problem.

Pausing and Restarting Meter Reading

Follow this procedure to stop and then restart data collection using the RoadMAPS unit. This is useful if you want to review the route reading status of a route or individual account or if you need to look up the starting address for a route to be read.

1 While the Reading indicator is pulsing, press the **Pause**

Route Pause Route button.

The Reading indicator switches to a Paused Icon.

2 To review account information before restarting, select either the Missed Reads or Captured Reads screen, depending on whether or not the account has already been read.

3 Select an account and press the **MIU Details** MIU Details button.

4 To resume automatic reading, press the **Read Route** Read Route button.

Reading continues and the Reading indicator switches back to a status of Reading.

Creating an Export File

After you have completed reading all of your routes, you need to create an export file for your utility to upload the read data to the host software.

When all routes have been read, use the following procedure to create an export file:

1 Press the **Route Export** tab to display the Route Export screen.

2 Press the **Export Routes** Export Routes button.

Exiting RoadMAPS Software

There are two screens, the Route Selection screen and the Route Export screen, that will allow you to exit the RoadMAPS software. From either screen, use the following procedure to exit the software and turn off the laptop.

1 Press the **Exit Route Reading** 

button.

The Welcome screen is displayed.

2 Press the **Exit Program** 

button.

RoadMAPS closes.

It is now safe to turn off your computer.

3 Press FN + OFF to turn off the laptop.

4 You can now safely remove the PC memory card.

Removing the PC memory card while the laptop is ON can cause data corruption on the card.

5 Drive back to your utility to return the PC memory card containing the read data so it can be uploaded to the host software. See “To exchange information with the host computer,” on page 4-4.

Notes

Chapter 5 Closing the RoadMAPS Unit

Follow this procedure to close up the RoadMAPS Unit and prepare it for removal from the vehicle.

1 With the laptop computer turned off, close the laptop display.

When closing laptop unit, make sure to push the center latch on the display downward and press firmly. Listen for a click to indicate that the laptop locking mechanism is engaged.

2 Remove the plug-in power cable from the cigarette lighter receptacle.

3 Remove the antenna from the vehicle roof.

4 Wrap both the plug-in power cable and the antenna cable in the Velcro strapping on the RoadMAPS Unit.

Figure 5.1 Laptop and cables prepared for closing

5 Remove the vehicle seat belt from the Seat belt Retention Loops and the Safety Latch on the RoadMAPS carrying case.

6 Replace the cover on the RoadMAPS Unit and secure it by closing the latches and hasps on the unit.

.

Figure 5.2 Cover replaced on RoadMAPS Unit

Notes:

Appendix A Specifications

Electrical Specifications

Table A.1 Electrical Specifications

Power Consumption	4A to a maximum of 7A
Power Supply	12VDC via plug-in power cord

Laptop PC Specifications

Table A.1 PC Specifications

System Type	Windows Based Intel® Pentium Processor or better
Keyboard	12 Function keys Spill proof membrane design Backlight with intensity control Built-in, solid state mouse Embedded numeric keypad 7 programmable function keys
Display	VGA Graphics Controller with 2MB VRAM. User adjustable contrast and intensity Light sensor which adjusts screen intensity per ambient light Shock/scratch resistant anti-glare plate
Operating System	Windows 95

Environmental Conditions

Table A.1 Environmental Conditions

Operating Temperature	-32° to 122°F (0° to 50°C)
Storage Temperature	-40° to 185°F (-40° to 85°C)
Operating Humidity	5% to 95% non-condensing relative humidity

Dimensions and Weight

Table A.1 Dimensions and Weight

Dimensions	Refer to following figure.
Weight	50 lbs.

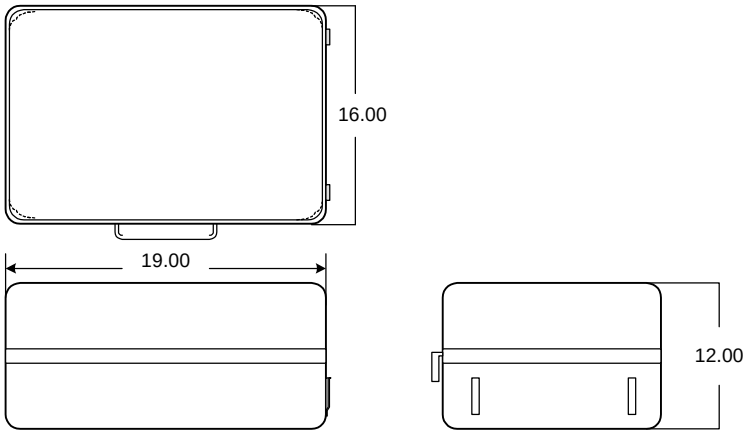

Figure A.1 RoadMAPS Unit Dimensions

Appendix B Troubleshooting

Table B.1 Troubleshooting Table

Problem	Things to Check	Probable Cause
No Power to the Unit	Make sure the red light on cigarette lighter power cord is lit and the electrical connections are secure.	Loose connection at cigarette lighter receptacle Loose connection between RoadMAPS Unit and power cable
	Check the continuity of the cable with ohm meter.	Bad power cable
	Check the electrical status of the utility vehicle.	Dead battery in utility vehicle
	Insert lighter and check to see if it heats up.	No power to cigarette lighter receptacle
Power is applied, RoadMAPS executes, but no route data is available.	Make sure PC Memory Card has been inserted.	PC Memory Card not inserted
	Select Self-Diagnostics mode on RoadMAPS start menu to verify that the data on the PC Memory Card is compatible.	Incompatible data on PC Memory Card. See "Performing Diagnostics," on Page B-2.

Table B.1 Troubleshooting Table

Problem	Things to Check	Probable Cause
Power is on but the screen is blank or unreadable.	Check Intensity settings.	Intensity settings too high or too low
	Make sure O-I (On/Off) key has been pressed.	Power to PC not on
RoadMAPS software appears to be working but does not collect data or collects erroneous data.	Check antenna connection.	Antenna not connected properly or not installed Broken antenna cable

Performing Diagnostics

RoadMAPS performs diagnostics at the time you start up the laptop computer, but there are other times you may want to check the status of the system components. For example, you may need to review diagnostics information if requested by RoadMAPS support personnel.

To display and exit RoadMAPS self diagnostics

Follow this procedure to display the RoadMAPS System Check screen.

1 Press the **Start** 

button from the RoadMAPS Welcome screen.

The Route Import screen (Figure B.1) appears.

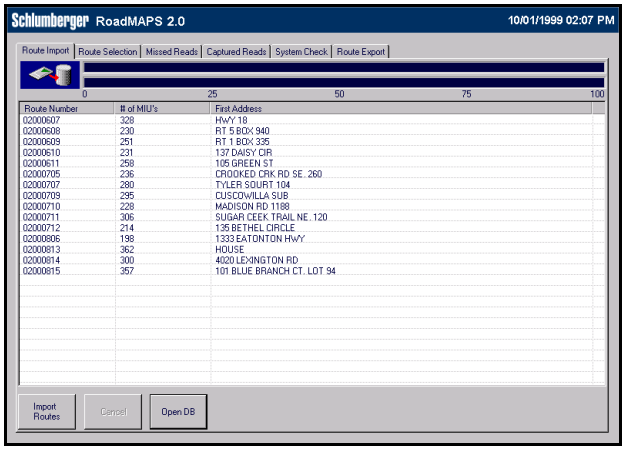

Figure B.1 Route Import Screen

2 Press the **System Check** tab to display the System Check screen, as shown in Figure B.2.

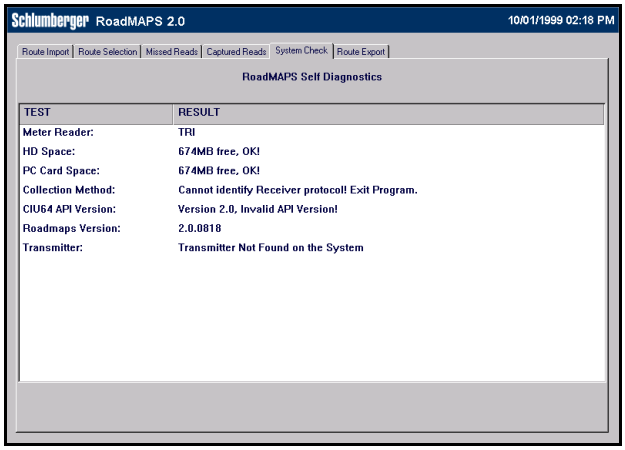

Figure B.2 System Check Screen

The RoadMAPS System Check screen contains the following fields for meter reading components:

- Meter Reader—Name of the meter reader as obtained from PC memory card files

- HD Space—Verification that the laptop has sufficient hard disk space
- PC Card space—The amount of available free space on the memory card
- Collection Method—Identification of the meter reading data collection method being used
- API Version—Firmware version installed on the RoadMAPS Unit
- RoadMAPS Version—Identification of the version number of the RoadMAPS software
- Transmitter—

3 To exit the RoadMAPS System Check screen, select another screen from the tabs.

Glossary

central processing unit — Often abbreviated as CPU, it is the brains of the computer. Sometimes referred to as the processor or central processor, the CPU is where most calculations take place. In terms of computing power, the CPU is the most important elements of a computer system.

default setting — A computer term that is similar in meaning to factory setting. The default setting is one that the RoadMAPS software automatically applies to an item. For example, the default setting for Beeper On/Off mode is Beeper Off. The beeper is always off unless the meter reader changes the beeper setting.

direction keys — Special keys on RoadMAPS laptop computer keyboard that allow you to move up or down a list of items. The direction keys, the Up (F5) and Down (F4) keys are indicated by arrow key icons with on the RoadMAPS display.

display — The top part of the laptop computer where selections and information about routes and accounts is shown

download — The process of sending readings and route information from the Host Computer to the PC Memory Card used for RoadMAPS readings

function key — Special key on the RoadMAPS keyboard that allows you to perform tasks quickly. The function keys used by RoadMAPS Software are on the top row of the laptop computer (PF1 - PF7) and in the two rows of F keys (F1 - F17). PF keys and F keys have an equivalent function in the RoadMAPS Software.

highlighted — Describes an item that is selected. When you select an item using the direction keys, the RoadMAPS Software lets you know that it has been selected by accenting the item in reverse video.

host computer — A computer that is accessed by a user working on another PC or workstation; for example, the host computer contains all the RouteMAPS or EZ RouteMAPS data to which the billing computer and other PC operators can connect.

message area — A portion of a screen that displays a message

meter number — The number by which a utility identifies a meter

MHz — Abbreviation for megahertz. One MHz represents one million cycles per second.

microprocessor — A chip that contains a central processing unit. At the heart of all personal computers and most workstations is a microprocessor. Microprocessors also control the logic of almost all digital devices.

MIU ID — An abbreviation for ***M***eter Interface ***U***nit Identifier, which is a discrete number used to identify a specific meter interface unit.

operating system — A critical program that runs on a computer that is used to run other programs. Operating systems perform basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories, and controlling any peripheral devices such as disk drives, ports, and printers.

PC — An abbreviation for Personal Computer.

PC memory card — A small, credit-card sized device that allows you to add memory, mass storage, and other capabilities to portable computers. PC memory cards are sometimes called PCMCIA cards.

personal computer	A general-purpose, single-user microcomputer designed to be operated by one person at a time. All are based on the microprocessor technology that enables manufacturers to put an entire central processing unit on one chip.
screen	The graphic portion of a display. RoadMAPS screens display information on three different areas to present the information shown in the display: a meter reading and loading indicator area with a graphic progress bar and pulsing reading indicator, a message and information display area, and an active function key display bar.
select	To choose a route or address by positioning a highlighted area using function keys. The highlighted item is selected.
upload	The process of sending readings and route data from the RoadMAPS laptop to the host computer via PC Memory cards.
Windows 95	A major release of the Microsoft Window operating system released in 1995. Windows supports 32-bit applications.

Notes:

Index

A
antenna 2-2, 5-1, B-2
Automatic Reader indicator 2-10

B
beeper
  feature 2-1
  function 2-3, 4-13
  settings 4-6
beginning meter reading 4-12
Billing system 4-2
broken antenna cable B-2

C
captured reads 2-12
carrying case 2-1
Caution icon 1-3
collection methods B-4
connecting the RoadMAPS antenna 3-6
contacting technical support 1-4

E
electrical specifications A-1
environmental conditions A-2
exiting
  RoadMAPS self diagnostics B-2
  RoadMAPS Software 4-21
EZ RouteMAPS Host Software 1-1, 4-2

H
host database 4-2
host file transfer to RoadMAPS 4-2
host software
  EZ RouteMAPS 1-1, 4-2
  RouteMAPS 1-1, 4-2

I
icons
  Caution 1-3
  Note 1-4
  Warning 1-3
identifying missed accounts 4-16
indicator message
  Reading 2-9
  Stopped 2-8
intensity settings B-2

K
keyboard 2-1
  specifications A-1

L
laptop computer
  center latch 5-1
  keyboard A-1
  specifications A-1
light sensor 2-1
loose connections B-1

M
missed reads 2-12
moving between accounts 4-18

N
navigation on the route display screen 4-15
Note icon 1-4

O
off-site meter reading 4-2
O-I (On/Off) key B-2

P
PC Card space B-4
PC memory card 4-4
PCMCIA
  card 3-2
  card slot 2-4
  card slots 3-3
  memory card. 4-1
  port 3-3
performing diagnostics B-2
placing the RoadMAPS unit in a vehicle 3-4
plugging in the RoadMAPS power cable 3-9
plug-in power cord 2-2
positioning your vehicle 4-5
product support 1-4

R
Reading icon 4-6
Reading message 2-9

reading meters 4-5
reads
  captured 2-12
  missed 2-12
removing
  plug-in power cord 5-1
  RoadMAPS carrying case cover 3-1
  the RoadMAPS antenna 5-1
re-reading missed accounts 4-19
resuming automatic reading 4-20
RoadMAPS
  antenna 2-2
  antenna placement 3-8
  automatic meter reading software 2-2
  beeper 4-6
  carrying case 2-1, 5-2
  data exchange 2-1
  Digital Multi-channel Receiver (DMR) 2-14
  display areas 2-10, G-3
  electrical Specifications A-1
  keyboard 2-1
  operating system A-1
  plug-in power cord 2-2
  receiving/processing device 2-13
  RF Front End 2-14
  Software 2-13
  specifications A-1
  starting the software 3-10
  system settings 3-12
  troubleshooting B-1
RoadMAPS Unit
  antenna 2-18
  closing the cover 5-3
  dimensions and weight A-2
  display A-1
  operating environment conditions A-2
  power supply 2-16
  turning on 3-10
route
  display 2-12
  selection screen 2-11
RouteMAPS Host Software 1-1, 4-2

S

Seatbelt Retention Loops 5-2
selecting
  route information 4-15
specifications
  electrical A-1
  laptop computer A-1
starting
  RoadMAPS laptop 3-10
  RoadMAPS Software 3-10
support 1-4
system
  processing 4-1
  settings 3-12

T

technical support 1-4
troubleshooting B-1
turning on
  beeper 4-6

U

up (F4) and down (F5) direction keys 4-18

V

Velcro strapping for antenna and power cables 3-7
viewing
  account details 4-17
  route detail 4-11
  routes 4-15

W

Warning icon 1-3