



# Field Service Tool Users' Manual





## Field Service Tool Users' Manual

## Proprietary Rights Notice

This manual is an unpublished work and contains the trade secrets and confidential information of Neptune Technology Group Inc., which are not to be divulged to third parties and may not be reproduced or transmitted in whole or part, in any form or by any means, electronic or mechanical for any purpose, without the express written permission of Neptune Technology Group Inc. All rights to designs or inventions disclosed herein, including the right to manufacture, are reserved to Neptune Technology Group Inc.

The information contained in this document is subject to change without notice. Neptune reserves the right to change the product specifications at any time without incurring any obligations.

## Trademarks Used in This Manual

ARB is a registered trademark of Neptune Technology Group Inc. E-Coder<sup>®</sup> is a registered trademark of Neptune Technology Group Inc. ProRead<sup>™</sup> is a trademark of Neptune Technology Group Inc.

N\_SIGHT<sup>™</sup> is a trademark of Neptune Technology Group Inc.

Trimble Nomad is a registered trademark of Trimble Navigation Limited.

Trimble Ranger 3 is a trademark of Trimble Navigation Limited.

CE Net Windows, Windows 6.1, and Windows Mobile Device Center are registered trademarks of Microsoft Corporation.

Other brands or product names are the trademarks or registered trademarks of their respective holders.

## FCC Conformity

### Trimble Ranger 3XE Handheld Computer

**"NOTE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense."



**Warning:** Changes or modifications to this device not expressly approved by Neptune Technology Group Inc. could void the user's authority to operate the equipment.

### Neptune HR4450i

**"NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help."



**Changes or modifications to this device not expressly approved by Neptune Technology Group Inc. could void the user's authority to operate the equipment.**

## Industry Canada

### Trimble Ranger 3XE Handheld Computer

This Class A digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareillage numérique de la classe A répond à toutes les exigences de l'interférence canadienne causant des règlements d'équipement. L'opération est sujette aux deux conditions suivantes: (1) ce dispositif peut ne pas causer l'interférence nocive, et (2) ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

### Neptune HR4450i

This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareillage numérique de la classe B répond à toutes les exigences de l'interférence canadienne causant des règlements d'équipement. L'opération est sujette aux deux conditions suivantes: (1) ce dispositif peut ne pas causer l'interférence nocive, et (2) ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

This device has been designed to operate with the antennas listed below with a maximum gain of 6dB. Antennas not included in this list or having a gain greater than 6dB are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

## CE Conformity

The CE5320 meets the 89/336/EEC directive intent for Electromagnetic Compatibility Compliance when used with appropriate accessories. These are Class B products. In a domestic environment, these products may cause radio interference, in which case, the user may be required to take adequate measures.

The compliance was demonstrated to the following specifications as listed in the official Journal of the European Communities.

EN 50081-2, Emissions  
EN 55022: Radiated, Class B  
EN 55022: Conducted, Class B

EN 50082-2, Immunity  
EN 61000-4-2: Electrostatic discharge  
EN 61000-4-3: RF radiated  
EN 61000-4-4: Fast transients  
EN 61000-4-6: RF conducted

Field Service Tool User's Manual  
Literature No. UM Service Tool 06.16  
Part No. 13004-002

Neptune Technology Group Inc.  
1600 Alabama Highway 229  
Tallasse, AL 36078  
Tel: (334) 283-6555  
Fax: (334) 283-7293

Copyright © 2010- 2016

Neptune Technology Group Inc.

All Rights Reserved.





# Contents

---

## 1 Introduction

Conventions Used in this Manual .....	1-1
FST System.....	1-2
Product Support within North America .....	1-3
Finding the Software Version Number .....	1-3
While You Are Using the Handheld.....	1-4
If the Handheld is Off .....	1-4
Contacting Customer Support .....	1-5
Phone .....	1-5
Fax .....	1-6
Email.....	1-6

## 2 Getting Started

System Requirements.....	2-1
Reviewing the FST Handheld Keyboard .....	2-2
Starting the FST Software.....	2-3
Using the FST .....	2-5

## 3 Basic Operating Instructions

FST Software Layout.....	3-1
Setting Up the FST .....	3-2
Adding a Site .....	3-2
Selecting a Site .....	3-4

---

Setting up the Log File . . . . .	3-5
Maintaining Passwords . . . . .	3-6
Using the FST in the Last Location . . . . .	3-7
Using the FST in a New Location . . . . .	3-8
Using Quick Install to Install an MIU . . . . .	3-10
MIU Configuration Programming . . . . .	3-12
Query the MIU . . . . .	3-13
Programming the MIU . . . . .	3-14
Measuring RSSI . . . . .	3-15
Using the RF Test Mode . . . . .	3-17
Using the MIU Simulator . . . . .	3-18
Using the R450 DC Simulator . . . . .	3-19
Using the Collector Monitor . . . . .	3-21
Setting Up the Collector Monitor . . . . .	3-22
Set Up the Collector Monitor . . . . .	3-22
Connecting the Ribbon Cable for the Winsystem Board . . . . .	3-23
Connecting the Ribbon Cable for the Advantech Board . . . . .	3-25
Monitoring the R450 DC . . . . .	3-27
Viewing the Troubleshooting Messages . . . . .	3-28
Starting the Collector Monitor . . . . .	3-30
Using Field Update . . . . .	3-31
Swiping the MIU . . . . .	3-31
Pit Installations . . . . .	3-32
Wall Installations . . . . .	3-32
Completing the Update . . . . .	3-33
Using HR4450i Update . . . . .	3-34
Exiting the Software . . . . .	3-35
Activating and Testing the MIU . . . . .	3-36

## 4 Troubleshooting

Basic .....	4-1
Basic Tasks .....	4-2
Troubleshooting the FST .....	4-3
Troubleshooting with the FST Kit .....	4-3
VSWR Analyzer .....	4-3

## Glossary

## Index

*Notes:*

# Figures

---

Figure	Title	Page
1.1	Hardware Screen .....	1-4
1.2	Trimble Ranger 3XE Start Screen .....	1-5
2.1	Keyboard Layout .....	2-2
2.2	FST Start Screen .....	2-3
2.3	Reconnect Button .....	2-4
2.4	Select Site Setup Screen .....	2-5
2.5	FST Functions .....	2-6
3.1	FST Toolbar .....	3-1
3.2	Add Site Screen .....	3-3
3.3	Site Setup Screen .....	3-4
3.4	Site Drop-down Selection List .....	3-4
3.5	Key Expiration Date .....	3-5
3.6	Programming Successful Message .....	3-5
3.7	Setup Log Files Screen .....	3-6
3.8	Password Screen .....	3-7
3.9	MIU Query Notification .....	3-9
3.10	MIU ID and Version Message .....	3-9
3.11	Quick Install Screen .....	3-10
3.12	Quick Install Results Screen .....	3-11
3.13	MIU Configuration Programming Screen .....	3-13
3.14	MIU Lower Power Alert .....	3-13
3.15	MIU Configuration Programming Screen .....	3-14
3.16	Measure RSSI Screen .....	3-16
3.17	RSSI Results Screen .....	3-16
3.18	RF Test Mode Screen .....	3-17
3.19	MIU Simulator Screen .....	3-18
3.20	MIU Simulator Response .....	3-19
3.21	Collector Simulator Screen .....	3-20
3.22	Collector Simulator Response Screen .....	3-21
3.23	Zoomed View of R450 DC with Winsystem Board .....	3-23
3.24	Winsystem Ribbon Cable Connections .....	3-23

<b>Figure</b>	<b>Title</b>	<b>Page</b>
3.25	FST Connected and Ready .....	3-24
3.26	Zoomed View of R450 DC with Advantech Board .....	3-25
3.27	Advantech Ribbon Cable Connections .....	3-26
3.28	FST Connected and Ready .....	3-26
3.29	Collector Monitor Screen .....	3-27
3.30	Monitoring Complete .....	3-28
3.31	Field Update Screen .....	3-31
3.32	Pit Installations .....	3-32
3.33	Wall Installations .....	3-33
3.34	HR4450i Update Screen .....	3-34
3.35	Field Service Tool Site Screen .....	3-35
3.36	Exit Confirmation Dialog .....	3-35
3.37	Activation Magnet .....	3-36

# Tables

---

Table	Title	Page
1.1	FST System Components .....	1-2
2.1	System Requirements .....	2-1
3.1	Configuration Type .....	3-11
3.2	Required Equipment .....	3-22
3.3	Trimble Ranger 3XE Monitor Messages .....	3-28

*Notes:*



# Chapter 1 Introduction

---

The *Field Service Tool (FST) Users' Manual* describes how the FST interfaces between the user and the FST. This manual explains how to install the software on the Trimble® Ranger™ 3XE handheld.

---

## Conventions Used in this Manual

This manual uses the following icons and typographic 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 successfully operating the FST.



The Note icon identifies information that clarifies a point within the text.



The Setup icon identifies a part of the application program that needs only periodic adjustment.



The Meter Reader icon identifies tasks that are usually performed by an FST Operator.



The Operator icon identifies tasks that are usually performed by a System Administrator.

---

## FST System

The FST Kit (Part No. 13023-000) consists of these following components:

**Table 1.1 FST System Components**

<b>Quantity</b>	<b>Item Description</b>	<b>Part Number</b>
1	Trimble Ranger 3XE handheld with HR4450i system *	13462-100
1	Carrying case	11741-002
1	Female to female null modem DB-9 cable, 6" long	13658-001
1	20-pin ribbon to DB9 adapter for Winsystem	13000-001
1	Cable/Wire, F cable for Advantech	13659-001
1	Trimble Ranger 3XE AC charging kit	13245-106
1	Tubular head key, R450 Data Collector (R450 DC)	13001-001
1	R450 DC power output measurement kit	13015-000
1	Trimble Ranger 3XE vehicle charging kit	13245-108

**Table 1.1 FST System Components**

<b>Quantity</b>	<b>Item Description</b>	<b>Part Number</b>
1	VSWR Analyzer	13003-001
1	Screwdriver	13032-001
1	Magnet, activation device	12287-001
1	Battery, cell	8136-024
1	Torx L-key	13084-001
1	N-male to N-male (right angle) cable assembly	13196-001
* To purchase the FST without handheld, order part number 13023-100 instead, along with the FST software kit, part number 13004-003.		

---

## Product Support within North America

Neptune offers you different ways to obtain high-quality, responsive Customer Support. However, before contacting Neptune, it is important that you know the version number of the software that your handheld uses. This information is useful for the Support Technician who helps you, and will expedite the problem-solving process.

## Finding the Software Version Number

There are two ways to find the version number of the Trimble Ranger 3XE software you are using. Choose one of the following methods to locate the version number.

## While You Are Using the Handheld

If you are currently using the Trimble Ranger 3XE, complete the following steps.

- 1 On the **Menu** tab, click **Hardware**.

The following screen appears with information on your FST system.

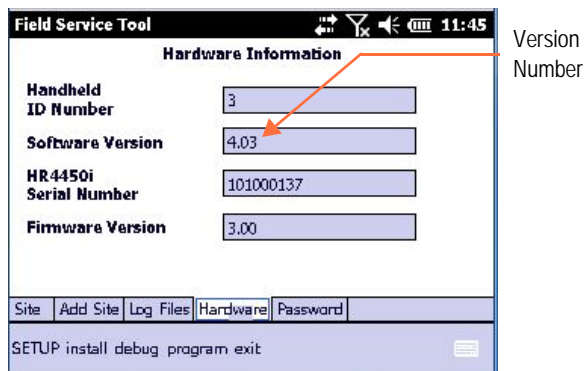



Figure 1.1 Hardware Screen

- 2 Locate the Software Version number and record it for Neptune's Customer Support Technician.

## If the Handheld is Off

If the Trimble Ranger 3XE is OFF, complete the following steps.

- 1 Turn the handheld **ON**, by pressing .
- 2 To start the FST, click the FST icon, as illustrated, located on the Desktop or in Program Files.



The Trimble Ranger 3XE should start with the HR4450i green button, if the device is connected properly. See Figure 1.2.

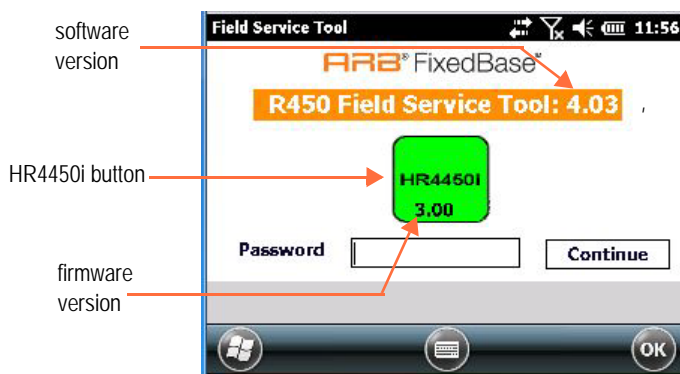


Figure 1.2 Trimble Ranger 3XE Start Screen

This screen also displays the current software and firmware versions. If the HR4450i appears in red, please see Chapter 4, "Troubleshooting," for more information.



If the FST Start screen does not appear, double-click the FST icon to start the software.

## Contacting Customer Support

Within North America, Neptune Customer Support is available Monday through Friday, 7:00 AM to 5:00 PM Central Standard Time by telephone, email, or fax.

### Phone

To contact Neptune Customer Support by phone, complete the following steps.

- 1 Call **(800) 647-4832**.
- 2 Select one of the following options.
  - Press **1** if you have a Technical Support Personal Identification Number (PIN).
  - Press **2** if you do not have a Technical Support PIN number.

- 3 Enter the six digit **PIN** number and press #.
- 4 Select one of the following options.
  - Press **2** for Technical Support.
  - Press **3** for maintenance contracts or renewals.
  - Press **4** for Return Material Authorization (RMA) for Canadian Accounts.

You are directed to the appropriate team of Customer Support Specialists. The specialists are dedicated to you until the issue is resolved to your satisfaction. When you call, be prepared to give the following information.

- Your name and utility or company name.
- A description of what occurred and what you were doing at the time.
- A description of any actions taken to correct the issue.

## Fax

To contact Neptune Customer Support by fax, send a description of your problem to (334) 283-7497. Please include on the fax cover sheet the best time of day for a Customer Support Specialist to contact you.

## Email

To contact Customer Support by email, send your message with a description of the problem to [hhsupp@neptunetg.com](mailto:hhsupp@neptunetg.com).

## Chapter 2 Getting Started

---

This chapter describes the hardware and software required to properly install the FST software and what you must do to prepare for installation. Read this guide carefully to familiarize yourself with the requirements.

---

### System Requirements

To use the FST, you need the following software and hardware. See Table 2.1.

**Table 2.1 System Requirements**

<b>Preliminary Requirements</b>	The following are required. <ul style="list-style-type: none"><li>• Microsoft Active Sync Version 3.8 or higher should be installed and the PC should be able to connect the handheld device.</li><li>• Microsoft.NET Compact Framework 2.0 should be installed for PC Version.</li></ul>
<b>Handheld Requirements</b>	Required Operating System is Windows Mobile 6.0 or higher
<b>Personal Computer (PC) Requirements</b>	Required Operating System is Windows XP, Windows Vista, or Windows 7.

## Reviewing the FST Handheld Keyboard

The FST handheld uses 51 keys to give you access to all the stored information and to allow you to enter new data. Most keys perform more than one function.

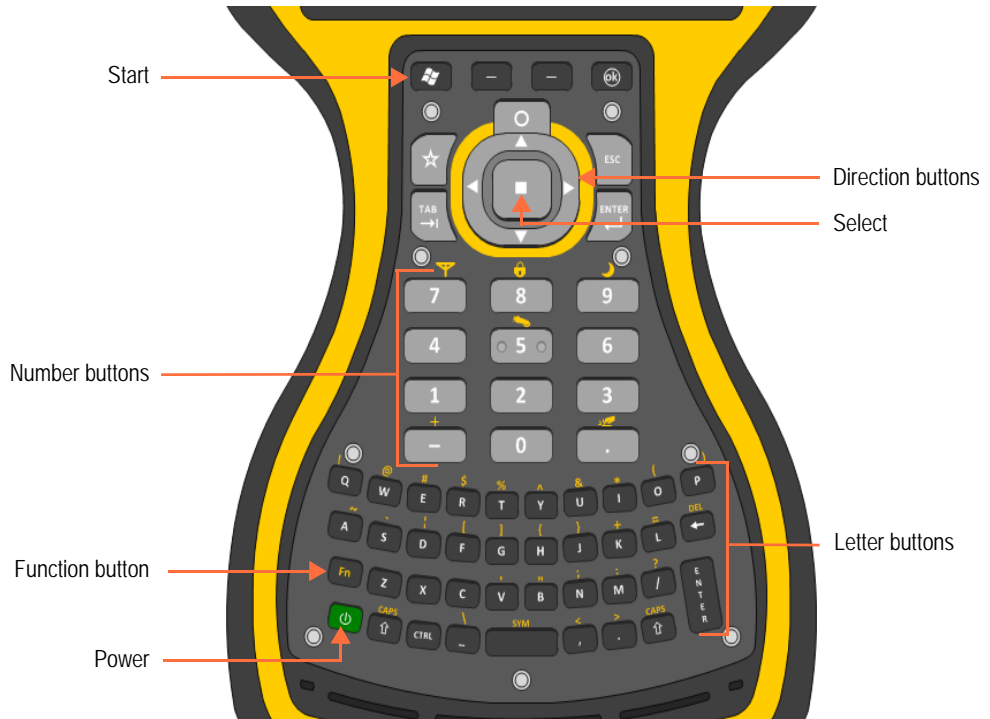


Figure 2.1 Keyboard Layout

- **Function Button**—allows you to enter special characters in a screen.
- **Direction Buttons**—allow you to navigate and move up or down a list of items and to move forward or backward in a data entry space or through the meters of a route.
- **Number Buttons**—allow you to access accounts while reading meters.
- **Letter Buttons**—allow you to enter a letter or character in a screen.



## Starting the FST Software



If the FST handheld is off, press  to turn on the FST.

To start the FST, complete the following steps.

- 1 To start the FST, double-click the FST icon located on the Desktop, as illustrated.



The FST should start with the HR4450i green button, if the device is connected properly. See Figure 2.2.

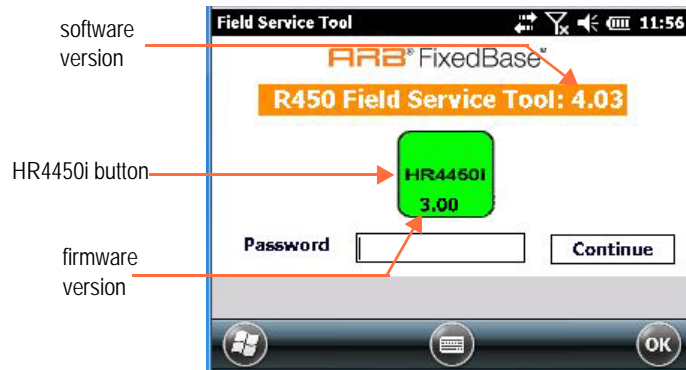


Figure 2.2 FST Start Screen

This screen also displays the current software and firmware versions. If the HR4450i appears in red, proceed to the next page.

- 2 Type the password you received from your system administrator, and click  .

Figure 2.3 illustrates the button as red,



Figure 2.3 Reconnect Button

If the HR4450i button is red, complete the following.

- Type your password, and click **Continue**
- The button should turn green.

If the button does not turn green, do the following:

- a Restart the FST by selecting Reconnect and Exit.
- b Complete step 1 again.

The FST should start with the HR4450i button green.

- c If the FST does not start, contact Neptune Customer Support. See "Contacting Customer Support" on page 1-5.



- 3 Continue with Step 2 in "Starting the FST Software" on page 2-3.

The Select Site Setup screen appears. See Figure 2.4.

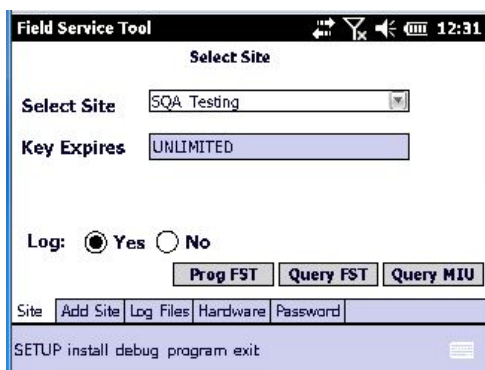


Figure 2.4 Select Site Setup Screen



You can return to this screen any time by clicking Setup on the page menu at the top of the screen.

## Using the FST

After programming the FST for the correct site, you can now choose what function you want to perform. Figure 2.5 on page 2-6 provides a chart listing the activities you can perform with the FST and where to go to perform these operations.

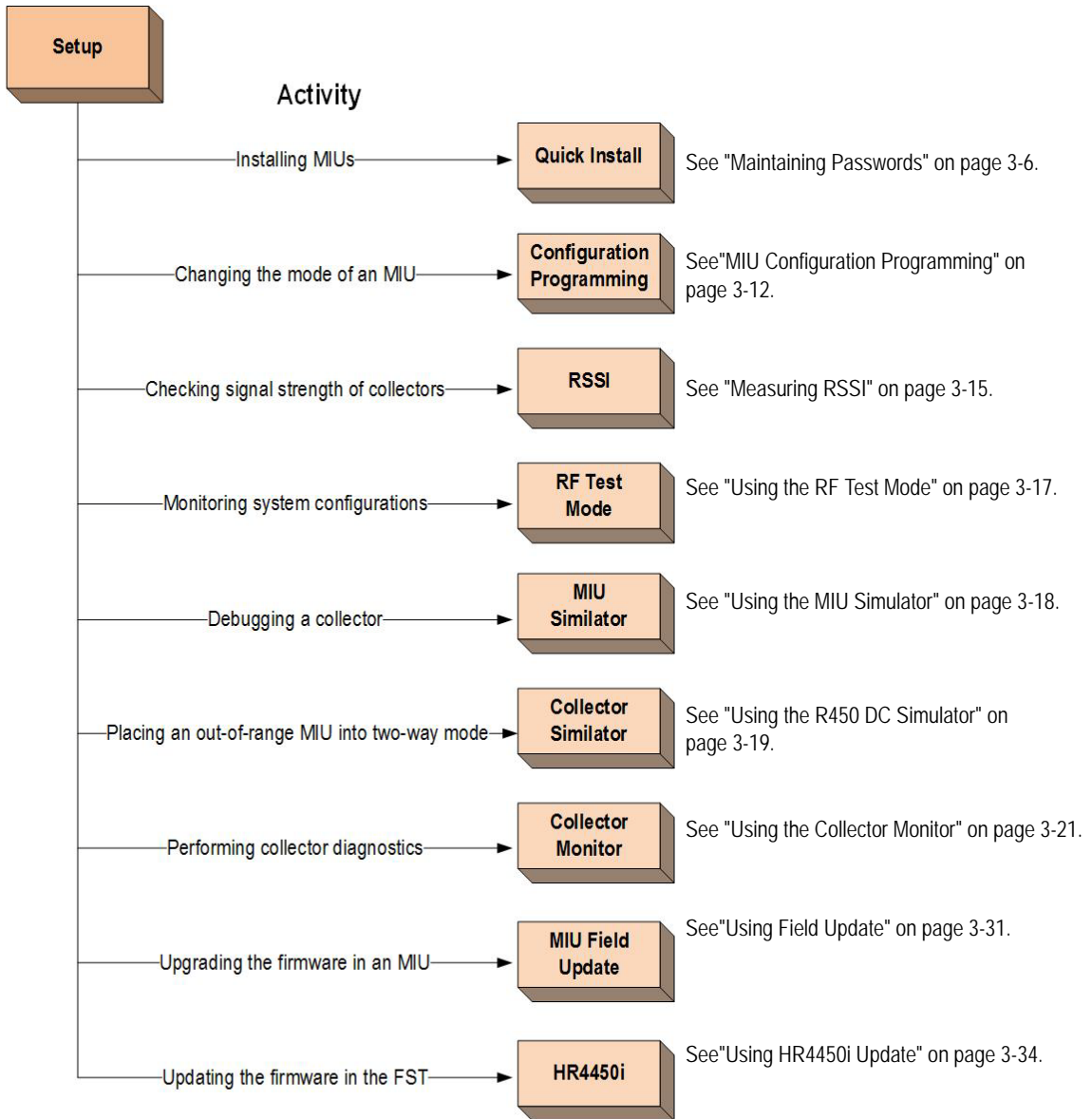


Figure 2.5 FST Functions

## Chapter 3 Basic Operating Instructions

---

This chapter provides fundamental instructions for operating the FST.

---

### FST Software Layout

Figure 3.1 shows the toolbar of the FST software. It is designed for the specific tasks or activities that you need to perform.



Figure 3.1 FST Toolbar

Site	Use to view a site or select another one in FST.
Add Site	Use to add a new site to your FST.
Log Files	Use select to generate a field log file.
Hardware	Use to view the handheld ID number, software version, HR4450i serial number, and the firmware version.
Password	Use to maintain and change your password.

---

## Setting Up the FST



Please refer to the Client Authorization Tool before moving forward with setting up the FST. A client authorization key is required to activate the FST.

Before you can begin using the FST, you must set it up for your use. There are certain tasks you must complete, such as:

- Adding a Site
- Selecting the Site
- Setting Up the Log File
- Programming the MIU

## Adding a Site

You can add a site to your FST by completing the following steps.



Be sure to obtain the key for the site you want to add from your System Administrator before you continue.

To add a site, complete the following steps.

- 1 Obtain the **Handheld ID Number** from the **Hardware** tab.
- 2 Communicate this number to the System Administrator.
- 3 Obtain the key for the site from your System Administrator.
- 4 On the **Setup** menu, click **Add Site**.

The following screen appears.

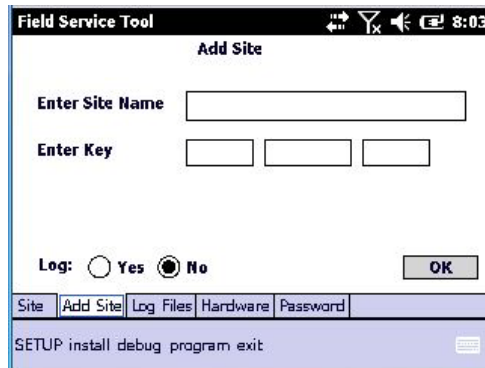


Figure 3.2 Add Site Screen

- 5 Type the name of the site in **Enter Site Name**.
- 6 Type the key you received from your System Administrator in **Enter Key**.



Be careful when typing "O" or "0" (letter or number) for the key.

- 7 Click **Yes** or **No** to save the operation to a log file.
- 8 Click **OK**.
- 9 Repeat Steps 3 through 8 to add another site.



After you have added a site, you must select it for your use. Complete the steps in on page 3-4 to select the site.

## Selecting a Site

When you first sign on to the FST, the Site tab appears with the last site used. See Figure 3.3.



Figure 3.3 Site Setup Screen

The first thing you must do is select the site. Complete the following steps to select a site.

- 1 On the **Setup** menu, click **Site**.

The following screen appears.

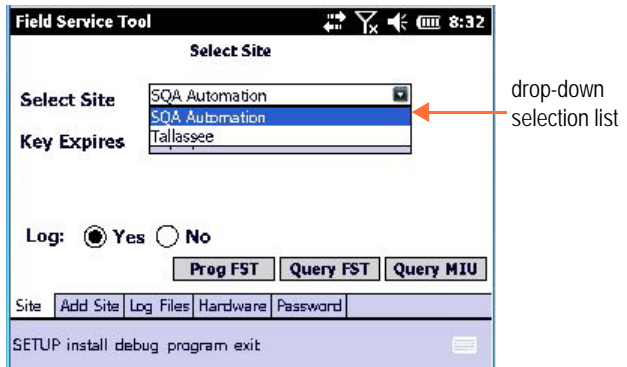


Figure 3.4 Site Drop-down Selection List

- 2 Using the drop-down selection list, choose a site.



The expiration date for the site appears in **Key Expires On**.

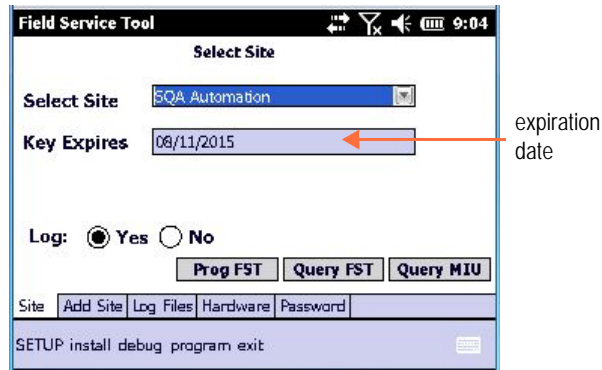


Figure 3.5 Key Expiration Date

- 3 Click **Yes** or **No** to save the operation to a log file.
- 4 Click **Prog FST**.

When the FST has been successfully programmed, the following message appears.



Figure 3.6 Programming Successful Message

## Setting up the Log File

On the Setup screen, you can select to generate a Field Log File. This log file is a text file that the FST can generate to use in work order systems. You can establish a location for the FST to place this file. Then you can turn this log file on and off on any other tab. Starting and stopping the log file on the same day will append all the new data to the end of the current log file. Starting the log file on any later date without browsing to a new location creates a new log file in the previously selected directory with the following format:

**FldLogMMDDYY.txt**

By default, log files are created in the Log Files folder in the Installation directory. To create the log file in a different location, complete the following steps.

- 1 Click **Setup**, and then **Log Files**.

The Setup Log Files screen appears.

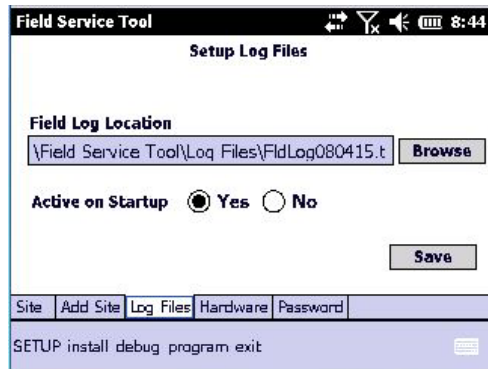


Figure 3.7 Setup Log Files Screen

- 2 For **Field Log Locations**, click **Browse** to set a location for the FST to place this file.
- 3 To have the log file active or inactive when you start the FST, select one of the following.
  - Press **Yes** for the log file to be active when starting.
  - Press **No** for the log file to remain inactive upon starting.
- 4 Click **Save**.

## Maintaining Passwords

In order to safeguard your FST, you should change your password frequently. On the Setup tab, you can select Password to maintain your password for the FST.

To maintain your password, complete the following steps:

- 1 Click **Setup**, and then **Password**.

The Password screen appears.

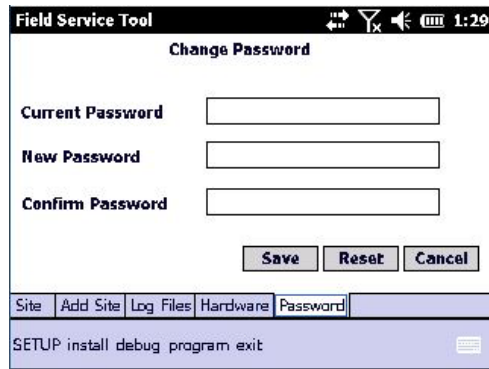


Figure 3.8 Password Screen

- 2 Tab to **Current Password** and type your password.
- 3 Tab to **New Password** and type your new password.
- 4 Tab to **Confirm Password** and type your password again to confirm accuracy.
- 5 Click **Save**.

The following message appears letting you know that your password was changed successfully.



## Using the FST in the Last Location

If you are using the FST at the location where you used it last, complete the following steps.



You can select **Yes** or **No** to produce a log file. See "Setting up the Log File" on page 3-5.

- 1 Click **Prog FST** to program the HR4450i.



You must perform this function every 24 hours.

- 2 When the message **HR4450i Programmed successfully** appears, click **ok**, and you continue to the functions on the Install, Debug or Program tabs.



If an error message appears, refer to the troubleshooting section of this manual.

## Using the FST in a New Location

If you are using the FST in a new location, you need to get the System ID and frequencies used by the site.



This information is embedded in the 13-digit Authorization code. The Authorization code must be obtained from the System Administrator.

### MIU Firmware Version



The MIU must be Firmware Version 2.16 or greater to perform this operation.

To determine if an FST has been authorized for a site, complete the following steps on the site tab.


- 1 Click **Query MIU**.

The following notification appears.



Figure 3.9 MIU Query Notification

(See "Activating and Testing the MIU" on page 3-36.)

- 2 At the location, reset an MIU with a magnet swipe.
- 3 Click  after three seconds.

A message appears displaying the MIU response.



Figure 3.10 MIU ID and Version Message

The MIU ID and Version appear.

- 4 Click .

The new **Site** and **Information** retrieved from the MIU appear on the Setup screen. These are not programmed into the FST yet.



If a message of Site Unknown appears for Select Site, the FST does not have an authorization code. Contact the System Administrator for a key. See "Selecting a Site" on page 3-4.

## Using Quick Install to Install an MIU

After you have set up the FST with valid site information, you can use the Quick Install function to help install an MIU. Use the Quick Install tab to validate the RF Link between the MIU and R450 DC and the quality of the connection between the MIU and register. The RF Link is important from the two-way communication system standpoint.

Complete the following steps to use Quick Install.

- 1 Click **Install** and then **Quick Install**. Figure 3.11 appears.

The screenshot shows the 'Field Service Tool' interface with the 'Quick Install' screen active. The screen is divided into several sections:
 

- Filter:** Radio buttons for 'Automatic' (selected) and 'Last 4 Digits' (with an empty input field).
- Reading:** Radio buttons for 'Yes' (selected) and 'No'.
- MIU ID:** An empty input field.
- Link:** A dashed line separates this section from the one below.
- ACQ COL:** An empty input field.
- MIU <- COL:** An empty input field.
- COL <- MIU:** An empty input field.
- Register:** Input fields for 'Type', 'Errors', and 'Read'.
- Log:** Radio buttons for 'Yes' (selected) and 'No'.
- Buttons:** 'Start', 'Stop', and 'Clear' buttons.
- Footer:** A status bar with 'Quick Install' and 'Config. Prog' tabs, and a command line showing 'setup INSTALL debug program exit'.

 A red arrow labeled 'Quick Install tab' points to the 'Quick Install' title at the top of the screen.

Figure 3.11 Quick Install Screen

- 2 Select either **Automatic** or **Last 4 Digits**. Selecting Last 4 Digits displays a field to enter the last four digits of the MIU ID. Select this if you are working in the same area as another installer.
- 3 Click **YES** if you want the reading packets from the MIU to be added to the Pass/Fail criteria of the installation process.



If you select Yes, this could take up to two additional minutes for a dual-port reading.

- 4 Click **Start**.
- 5 Swipe the MIU, as described in "Activating and Testing the MIU" on page 36.

6 Listen for approximately 45 seconds.



The FST listens for communications. It can take up to 45 seconds to display installation information, and an additional two minutes for a dual-port reading.

The screen displays the results gathered. See Figure 3.12.

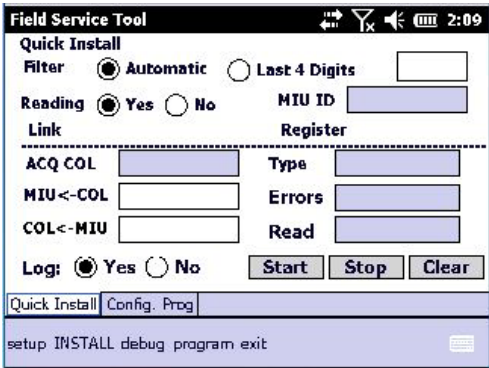


Figure 3.12 Quick Install Results Screen

The following information displays:

- **MIU -> COL** displays the signal strength from the MIU to the R450 DC.
- **COL -> MIU** displays the signal strength from the R450 DC to the MIU.
- **MIU ID** displays the ID for the MIU.
- **Type** displays the type of configuration as described in Table 3.1.

Table 3.1 Configuration Type

Type	Definition
E-Coder®	Single Port E-Coder
ProRead™	Single Port ProRead
E-Coder Dual	Dual Port with E-Coder
ProRead Dual	Dual Port with ProRead

**Table 3.1 Configuration Type**

Type	Definition
Other	Competitive Encoders. (See <i>R450 MIU Installation and Maintenance Guide</i> , Part No. 12857-001, for competitive encoders.)

- **Errors** displays any errors found using the Quick Install.
- **Read** displays the reading, if selected and successful.



If you clicked Yes to acquire a reading, this can take an additional two minutes for a dual port.

- 7 Click **Stop** to turn off the Quick Install.
- 8 Click **Clear** to clear the Quick Install screen.

## MIU Configuration Programming

The MIU Configuration Programming tab allows you to either program the MIU for operating and alarm modes, or query the MIU for its current operating mode. To program the MIU, you must first do one of the following:

- **Query** the MIU.
- Enter the **MIU ID** and **Version Number**.



The MIU must have firmware version 2.16 or greater to perform this operation.

To program an MIU, click one of the following:

- **Install** and then **ConfigProg**
- **Program** and then **ConfigProg**



A screen similar to Figure 3.13 appears.

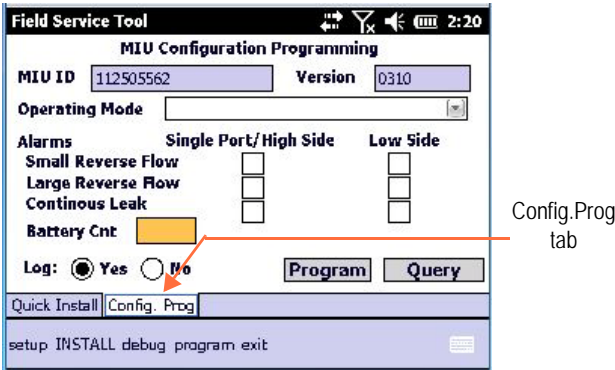


Figure 3.13 MIU Configuration Programming Screen

### Query the MIU



To determine the current operating mode of the MIU, run Query. For a list of valid operating modes, see the See *R450 MIU Installation and Maintenance Guide*, Part No. 12857-001.

- 1 Click **Query**.

The following message appears.



Figure 3.14 MIU Lower Power Alert

- 2 At the location, reset an MIU by swiping it with a magnet.
- 3 Click **ok**.

The following screen appears with the information from the queried MIU.



Figure 3.15 MIU Configuration Programming Screen

The fields are then filled with the information from the queried MIU.

## Programming the MIU


Complete the following steps to program the MIU.

- 1 From the drop-down selection list, click the **Operating Mode**, for example,
  - Normal Mode
  - User Profile Mode
  - Alarm Mode
  - All
- 2 Click the checkboxes to select whether to include the following for either or both the **Single Port/High Side** or **Low Side**:
  - Small Reverse Flow
  - Large Reverse Flow
  - Continuous Leak
- 3 Click **Yes** or **No** to save the operation to a Log file.
- 4 Click **Program**.

The following screen appears.



See "Activating and Testing the MIU" on page 3-36.

- 5 At the location, reset an MIU with a magnet swipe.
- 6 Click  after three seconds.

A message appears stating: **MIU Programming Successful.**

---

## Measuring RSSI



The FST must be programmed with valid site information to perform this task. See "Setting Up the FST" on page 3-2.

Received Signal Strength Indication (RSSI) is a measurement of the power present in a received radio signal. The Measure RSSI tab allows you to make sure that an MIU has sufficient signal strength from an R450 DC.

To measure RSSI, complete the following steps.

- 1 Click **Debug** on the menu at the bottom of the screen.
- 2 Select **RSSI**.

The following screen appears.

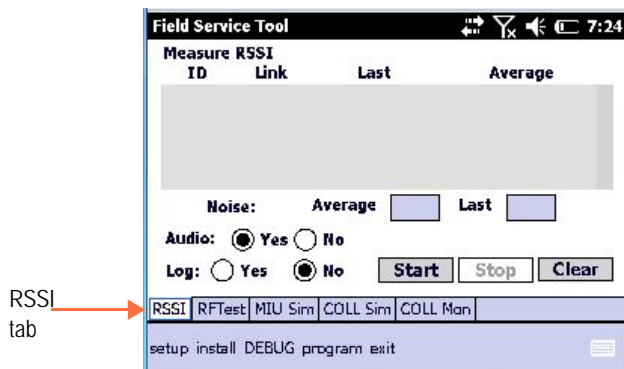


Figure 3.16 Measure RSSI Screen

- 3 Click **Start** to turn on the FST.

As the FST receives new R450 DCs, they are added to the list. The list sorts by highest average RSSI value. The background average and peak noise are also shown. Results appear on a screen similar to the following. See Figure 3.17.



Figure 3.17 RSSI Results Screen

- 4 Click **Stop** to turn off the receiver. This leaves the list displayed for future reference.

You can use this reference for the following:

- Navigate away from the RSSI tab and then return to check the R450 DC list.
  - Add to the list of R450 DCs for the **MIU Simulator**. See "Using the MIU Simulator" on page 18.
- 5 Click **Clear** to clear the Measure RSSI screen. This also clears the list of R450 DCs for the MIU Simulator.

## Using the RF Test Mode



The FST must be programmed with valid site information to perform this task. See "Setting Up the FST" on page 3-2.

The RF Test mode allows you to monitor messages that are transmitted by nearby MIUs and R450 DCs. These messages are decoded and then displayed on the screen.

To use the RF test mode, complete the following steps.

- 1 Click **Debug** on the menu at the bottom of the screen.
- 2 Select **RF Test**.

Figure 3.18 appears.

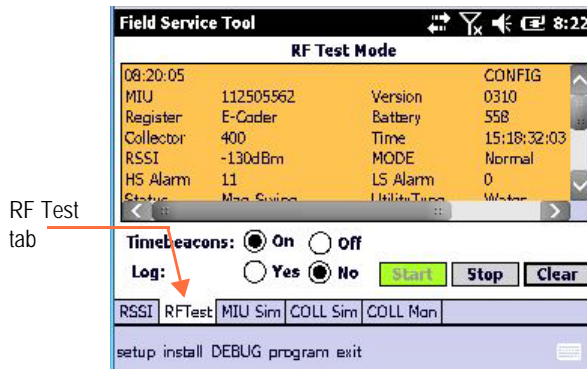


Figure 3.18 RF Test Mode Screen

- 3 Click **Start** to turn on the RF Test Mode.

- 4 Click **Stop** to turn off the RF Test Mode.
- 5 Click **Clear** to clear the RF Test Mode screen.

## Using the MIU Simulator



The FST must be programmed with valid site information to perform this task. See "Setting Up the FST" on page 3-2.

The MIU Simulator allows the user to simulate an MIU in order to test an R450 DC. The MIU simulator can send either a reading or a configuration packet. Certain parameters in each packet can be set up in SIMULATORMODE.txt Mode. Refer to "Activating and Testing the MIU" on page 3-36.



- The FST does not have the same transmission power as an MIU. This feature is meant to be used in close proximity of the R450 DC being tested. You cannot use this to determine MIU placement.
- The simulated MIU will have an ID of 110,000,000.

To simulate the MIU, complete the following steps.

- 1 Click **Install** or **Debug** on the menu at the bottom of the screen.
- 2 Select **MIU Sim**.

Figure 3.19 appears.

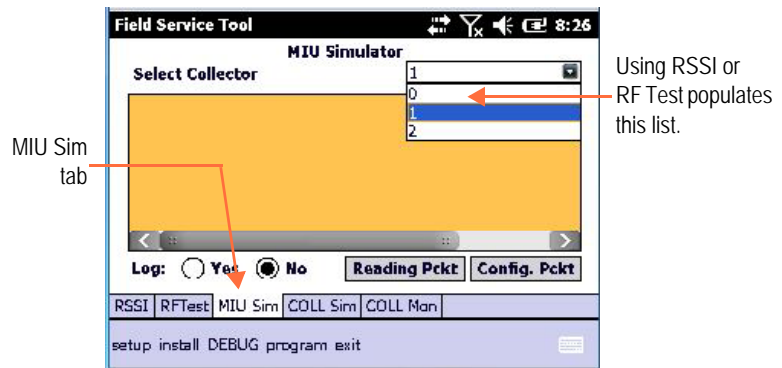


Figure 3.19 MIU Simulator Screen



If the Select Collector drop-down list does not display any values, use RSSI or RF Test to populate the list. See "Measuring RSSI" on page 3-15 or "Using the RF Test Mode" on page 3-17. Collector "0" is the default value.

- 3 Select the R450 DC for which you want to transmit a packet.
- 4 Click **Reading Pckt** or **Config. Pckt**.

If the R450 DC receives the packet transmitted by the MIU Simulator, it acknowledges the packet and **Received Response** appears on the screen.

Figure 3.20 displays the information received from the MIU Simulator.

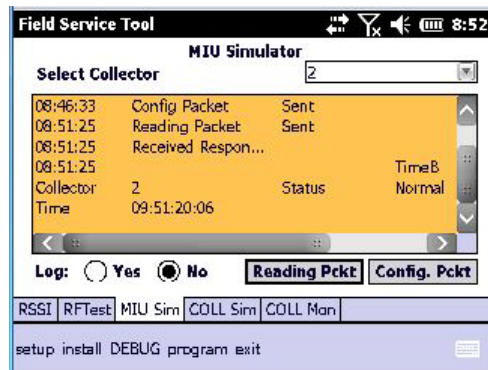


Figure 3.20 MIU Simulator Response

## Using the R450 DC Simulator



The FST must be programmed with valid site information to perform this task. See "Setting Up the FST" on page 3-2.

The R450 DC Simulator feature allows you to use the FST to simulate an R450 DC for the purpose of debugging an MIU. The FST can be set up to send out time beacons. You can then reset the MIU with a magnet swipe.

The MIU should then receive a signal from the FST's simulated R450 DC. Then it transmits a configuration packet to the FST. Next, the MIU transmits a reading to the FST. You can set up the FST to acknowledge this reading just as an R450 DC in the field would do.



The simulated R450 DC will have an ID of 1023.

To set up the Collector Simulator, complete the following steps.

- 1 Click **Debug** on the menu at the bottom of the screen.
- 2 Select **COLL Sim**.

The Collector Simulator screen appear as illustrated in Figure 3.21.

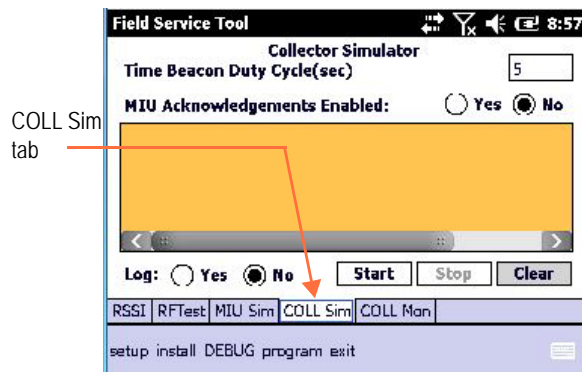


Figure 3.21 Collector Simulator Screen

- 3 Enter the number of seconds for the **Time Beacon Duty Cycle** (sec). The *time beacon duty cycle* is the time between simulated time beacons. You can set this from 2 to 20 seconds.
- 4 Click **Yes** for **MIU Acknowledgments Enabled** for the FST to acknowledge received packets.



- 5 Press **Start** to begin the Collector Simulator. Figure 3.22 appears.

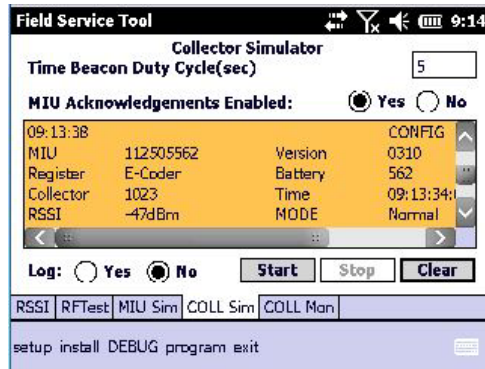


Figure 3.22 Collector Simulator Response Screen

- 6 After you receive all the information you need, click **Stop** to stop the Collector Simulator.
- 7 Click **Clear** at any time to clear the Collector Simulator screen.



If the MIU is in two-way communications with the R450 DC, you need to swipe the MIU again in order for it to acquire its original R450 DC again.

## Using the Collector Monitor

The Collector Monitor feature allows you to connect to the serial port of an R450 DC to retrieve diagnostic information about the collector status. This can give information such as connection status and IP address.

The following section describes how to set up Collector Monitor and monitor the R450 DC.

## Setting Up the Collector Monitor

The following table describes the tools required to set up the Collector Monitor.

**Table 3.2 Required Equipment**

Part No.	Description
13000-001	20-pin ribbon to DB9 adapter for Winsystem
13659-001	Cable/Wire, F Cable for Advantech
13658-001	Null modem serial female-to-female cable
13001-001	Tubular head key, R450 DC

### Set Up the Collector Monitor

To set up the Collector Monitor, complete the following steps.

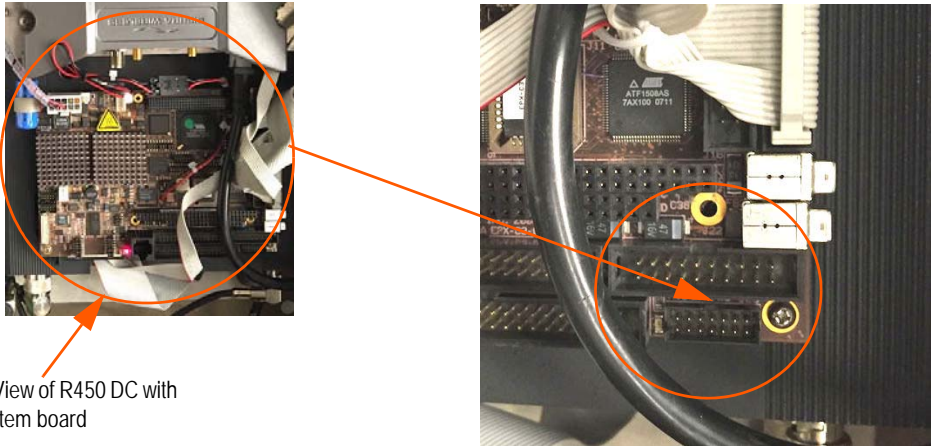
- 1 Open the door of the R450 DC using the Tubular Head Key.



Caution should be exercised when working inside the R450 DC due to high voltage.

- 2 Identify which board is in the R450 DC you are viewing.
  - Figure 3.23 on page 3-23 shows the interior of the R450 DC with Winsystem board.
  - Figure 3.26 on page 3-25 shows the interior of the R450 DC with Advantech board.
- 3 Complete the instructions for the R450 DC board in the R450 DC that you have.

### R450 DC with Winsystem Board



Inside View of R450 DC with Winsystem board

Figure 3.23 Zoomed View of R450 DC with Winsystem Board

### Connecting the Ribbon Cable for the Winsystem Board

To connect the ribbon cable for the Winsystem board, complete the following steps.

- 1 Locate the ribbon cable with the red stripe, shown in Figure 3.23. Connect the cable with the red strip to a pin in the ribbon cable connector as illustrated in Figure 3.24.

20-pin ribbon to DB9 adapter for Winsystem (Part No. 13000-001)

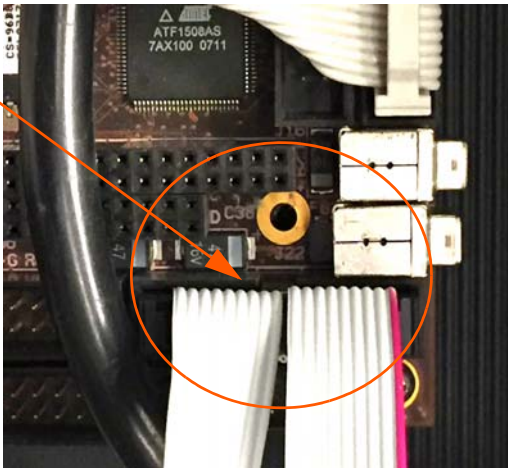


Figure 3.24 Winsystem Ribbon Cable Connections

- 2 Connect the other end to the null modem serial female-to-female cable. See Figure 3.24 on page 3-23.
- 3 Connect the other end of the serial female-to-female cable to the FST.

Figure 3.25 shows the FST connected to the R450 DC with Winsystem board ready for diagnostics.



Null modem serial  
female-to-female cable  
(Part No. 13658-001)

Figure 3.25 FST Connected and Ready

## R450 DC with Advantech Board

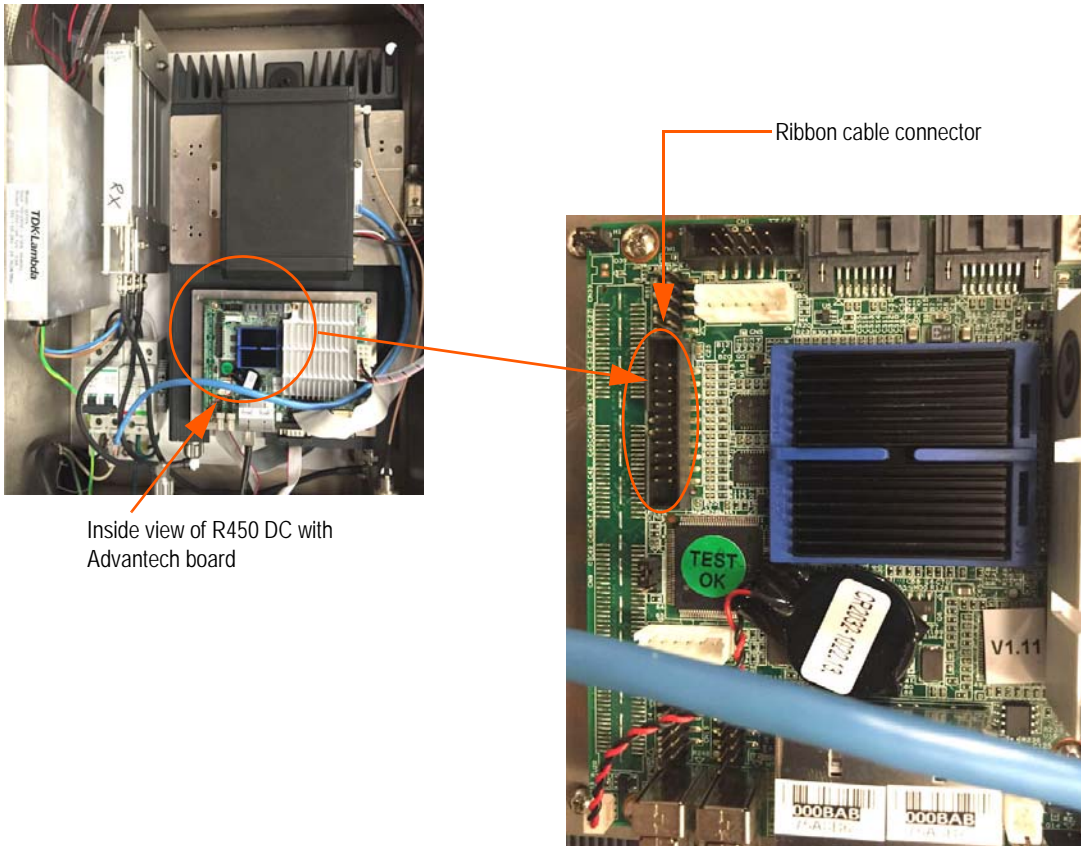


Figure 3.26 Zoomed View of R450 DC with Advantech Board

### Connecting the Ribbon Cable for the Advantech Board

To connect the ribbon cable for the Advantech board, complete the following steps.

- 1 Locate the white ribbon cable in the R450 DC to the connector.
- 2 Connect the cable to a pin in the ribbon cable connector as illustrated in Figure 3.27 on page 3-26.

Advantech ribbon cable connector  
(Part No. 13659-001)

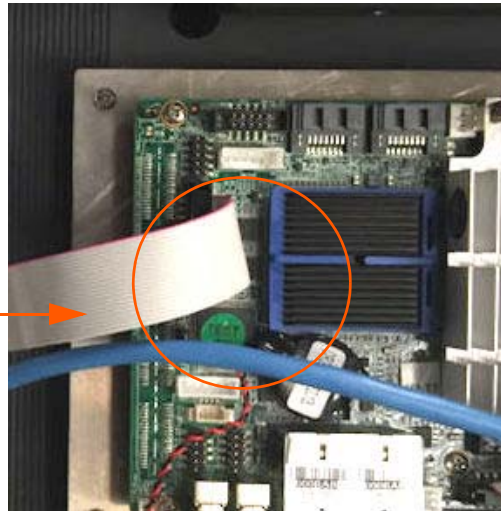


Figure 3.27 Advantech Ribbon Cable Connections

- 3 Connect the other end to the null modem serial female-to-female cable. See Figure 3.27.
- 4 Connect the other end of the serial female-to-female cable to the FST.

Figure 3.28 shows the FST connected to the R450 DC with Winsystem board ready for diagnostics.

Null modem serial  
female-to-female cable  
(Part No. 13658-001)

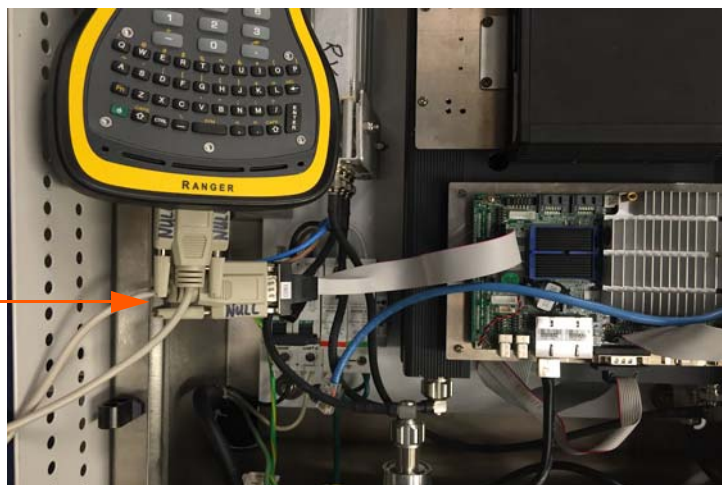


Figure 3.28 FST Connected and Ready

## Monitoring the R450 DC

To monitor the R450 DC, complete the following steps.

- 1 For the handheld, connect the DB9 to the serial cable into the header onto the R450 DC.



If you are using the PC version, use a null modem serial cable to connect to the R450 DC from the PC serial port.

- 2 Click **DEBUG** on the menu at the top of the screen.
- 3 Select **COLL Mon**.

The Collector Monitor screen appears as illustrated in Figure 3.29.

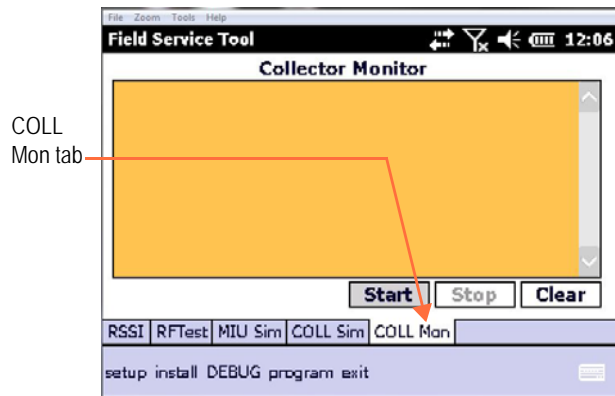


Figure 3.29 Collector Monitor Screen

- 4 Scroll to view the remaining messages for the R450 DC.  
See Figure 3.30 on page 3-28.

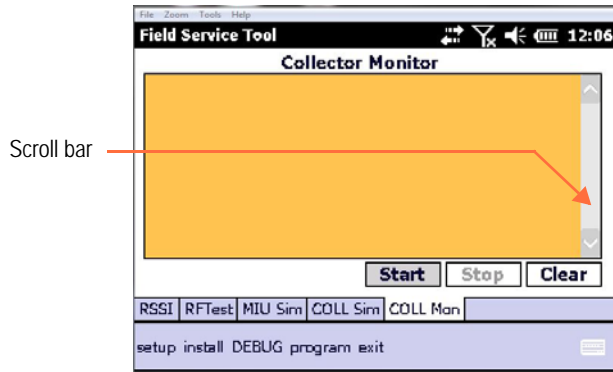


Figure 3.30 Monitoring Complete

### Viewing the Troubleshooting Messages

Refer to the following table for the messages that appear for the Trimble Ranger 3XE.

**Table 3.3 Trimble Ranger 3XE Monitor Messages**

No.	Message	Description
1	App Startup	The R450 DC application has started successfully.
2	Database Up	The database has successfully started and the application has connected.
3	Config Type	There are two possible outputs. Thumb Drive or Database. <ul style="list-style-type: none"> <li>• Thumb drive means the application started and used the configuration from the thumb drive.</li> <li>• Database means the application used the configuration out of the R450 DC configuration table.</li> </ul>
4	Collector Number	Collector number filled with the customer ID to make the R450 DC ID (example 36084_0042).
5	Customer ID	Unique 4-digit code given to each customer. Filled with the R450 DC number to make the R450 DC ID (example 36084_0042).



**Table 3.3 Trimble Ranger 3XE Monitor Messages**

No.	Message	Description
6	App Version	Version of the R450 DC application.
7	Host IP	IP of the host server. The server to which the R450 DC should sync data.
8	Net Connection	Manner in which the R450 DC is connected to the Internet: GPRS (cell modem), DHCP, Static IP, etc.
9	Network Status	Manner in which the R450 DC views the status of the network. <ul style="list-style-type: none"> <li>• Internet up - network available for data transfer</li> <li>• Internet down - no data transfer possible</li> <li>• No Connect to GPRS - unable to dial the serially connected cell modem</li> </ul>
10	Sync Status	Status of last attempted sync. Either Successful or Failed.
11	Ntp Status	Result displayed as "up" when NTP has at least one successful time sync in a 24-hour period.
12	Date	Date and time this data was last updated. Should be within 60 seconds of current UTC time.
13	Last Config	MIU ID and time of last config packet
14	Last Reading	MIU ID and time of last reading packet; number completed.

## Starting the Collector Monitor

- 1 Click **Start**.

The following message appears.



- 2 Click **ok**.

If the R450 DC is powered, the diagnostic message is sent every minute. If you are power cycling the R450 DC, it can take up to 10 minutes to receive the first message. The received data is then displayed in the window.

- 3 Click **Stop** to stop receiving the log from the R450 DC on the screen. You can now view the information for diagnosis by using the scroll bar to the right of the screen to navigate to the appropriate location.
- 4 Click **Clear** to clear all the Collector Monitor information.

Sent :      Record 1 of X

## Using Field Update

Figure 3.31 illustrates the Field Update tab, an additional program for the FST.

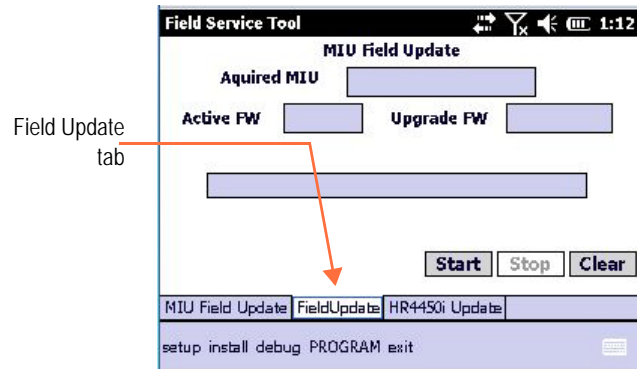


Figure 3.31 Field Update Screen

This software allows Over the Air programming of early production R450 DC units and simplifies the upgrade process for later units.

## Swiping the MIU

Complete the following steps to swipe the MIU.

- 1 Prepare to swipe the MIU.
- 2 Refer to the illustrated configurations for optimal wireless performance.
  - See "Pit Installations" on page 3-32.
  - See "Wall Installations" on page 3-32.

## Pit Installations

For pit installations, lay the lid upside down on the ground and place the FST antenna approximately one foot from the center of the antenna. See Figure 3.32



Figure 3.32 Pit Installations

## Wall Installations

For wall installations, hold the FST approximately one foot in front of the MIU. Make sure the antenna of the FST is aligned with the front of the MIU. See Figure 3.33 on page 3-33.



Figure 3.33 Wall Installations



The timing process for the MIU magnet swipe is critical for proper operation. The FST counts down and beeps when you need to swipe the MIU. Perform a quick single swipe on the MIU. Note, you may be asked to swipe the unit multiple times. This is part of the programming process.

## Completing the Update

Complete the following steps for the update.

- 1 On the Field Update tab (Figure 3.31 on page 3-31), click **Start**.
- 2 Complete the on-screen instructions.
- 3 Pay attention to the screen during the programming process. You could be prompted by the software to perform additional magnet swipes on the MIU depending on the version of firmware being upgraded.

## Using HR4450i Update



Make sure that the MIU Update file is selected per its **base** version.

The Neptune HR4450i is the radio used in the FST to communicate with the R450 System. The HR4450i Update tab allows you to upgrade the firmware on your HR4450i as Neptune adds new features to the FST.

To update your HR4450i, complete the following steps.

- 1 Obtain an HR4450i update file from Neptune.
- 2 Click **Browse** to select the update file.
- 3 Click **Program** on the menu at the bottom of the screen.

The HR4450i Update screen appears as illustrated in Figure 3.34.

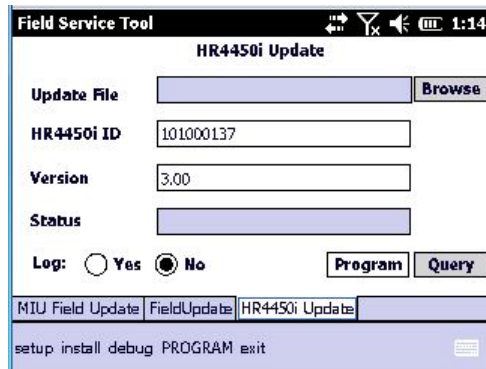


Figure 3.34 HR4450i Update Screen

- 4 Click **Program**.

The programming status appears in Status.



If you are using the handheld version then restart is required. Follow the on-screen instructions to complete the update.

You have now completed the upgrade for the HR4450i.

## Exiting the Software

To exit the FST software, complete the following steps.

- 1 On any screen, exit the FST software by clicking **X** on the toolbar.

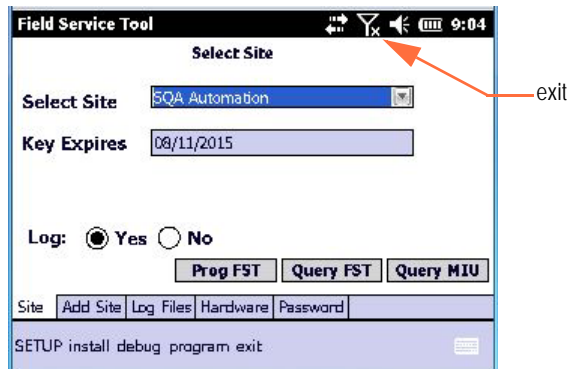


Figure 3.35 Field Service Tool Site Screen

The Exit Confirmation dialog as illustrated in Figure 3.36.




Figure 3.36 Exit Confirmation Dialog

- 2 Click one of the following:
  - **Yes** to close the application
  - **No** to return to the application.

The FST software closes immediately when you click **Yes**.



You can manually turn off the handheld by pressing . After pressing this key, the screen goes blank, indicating that the handheld is off.

---

## Activating and Testing the MIU

Complete the following steps to activate and test the R450 MIU.

- 1 Position the magnet against the left side of the MIU directly in line with the Neptune logo, as shown in Figure 3.37. Swipe it bringing it from the side and around the corner to the top to activate the MIU.



Figure 3.37 Activation Magnet

- 2 The MIU then transmits its configuration packet to the R450 DC approximately 30 seconds following the magnet swipe.



During the 30 seconds before the configuration transmission, the MIU acquires the strongest R450 DC for that location.

- 3 The MIU sends the register reading to the R450 DC approximately 40 seconds following the configuration packet. (Earlier versions of the MIU send the reading 15 seconds later.)



## Chapter 4 Troubleshooting

---

This chapter provides a list of the system messages for the FST and when they display. Use the information in this chapter to solve any problems. If you still cannot solve the problem, contact a Customer Support Specialist. For help in contacting Neptune Customer Support, refer to the topic "Product Support within North America" on page 1-3.

---

### Basic Tasks


Question	Answer
----------	--------

The FST is not working.

If something is not working, try the following:

1. Turn the unit **OFF** then **ON**.
2. Restart the software.
3. Try again.

The display is empty and the FST does not beep when I press a key.

The FST might be turned off. Press the  button to turn the unit on.


The FST does not refresh when I place it in a communication cradle.

- If the battery indicator is not red, make sure the communication cradle is connected to a proper outlet.
- Check that all cables are secure.

## Basic Tasks

### Question

### Answer

When I press the , the FST does not turn on.

The battery may be too low. Place the FST handheld in a communication cradle. Then, check the color of the battery indicator in the bottom right corner of the FST handheld. The indicator turns red if the battery is low.


**WARNING:** On Battery X% (indicating a very low battery life remaining).

If this message appears, place the FST handheld in the cradle and allow to remain until the indicator turns green, indicating that the battery is fully charged. Recharging the battery can take from three to six hours.

The FST handheld locks and does not respond when I press keys.

- Press .
- Reset the unit.

The display contrast is weak or the display background is very dark.

- Press  to brighten the display.
- The FST handheld has been exposed to temperatures outside the range of -30°C to 50°C (-22°F to 122°F). Short exposure to temperatures lower or higher than these can cause the display to turn very dark or very light until the unit returns to the recommended operating temperature.

The FST handheld does not turn off automatically or manually.

The FST handheld is in a communication cradle, in which case the FST handheld remains on until you remove it from the cradle and turn it off.

---

## Troubleshooting the FST

Use the FST kit to assist you in troubleshooting problems that can arise with your equipment.

### Troubleshooting with the FST Kit

To troubleshoot using the FST kit, complete the following steps.

- 1 If not already running, start the FST software on the handheld.
- 2 Program it for the specific location being tested. Refer to "Using the FST in a New Location" on page 3-8.

When you complete the setup for the Collector Monitor, you can read the RSSI levels of the R450 DC.

- 3 Click **Debug** menu then the **RSSI** tab. Refer to "Measuring RSSI" on page 3-15.
- 4 When the RSSI screen appears, click **Start**.



When measuring Collector power, the acceptable power should be:

- -60 dB for R450 DC
- -66 dB for R450 Mini Collector (R450 MC)

### VSWR Analyzer



Refer to the *R450 Data Collector Installation and Maintenance Guide* for instructions on the VSWR Analyzer

***Notes:***

# Glossary

---

<b>activate</b>	Process of making a device active and causing it to function.
<b>application program</b>	Usually referred to as an <i>application</i> , rather than an <i>application program</i> , it is a type of software program that performs a specific task useful to the user. Examples include database management applications, such as N_SIGHT™, or word processing applications, such as Microsoft® Word®.
<b>communication cradle</b>	Device used to charge and exchange data with a handheld. Whenever a handheld is placed in a communication cradle, the battery of the handheld begins recharging, and it is ready to exchange data with the host computer.
<b>cycle, time beacon duty</b>	Time between simulated time beacons. Can be set from 2 to 20 seconds.
<b>E-Coder</b>	Neptune's high-resolution solid state absolute encoder register. Functions in two modes: E-Coder BASIC and E-CoderPLUS. The E-Coder BASIC mode functionality is the same as ProRead (ARB VI), with programmability up to a 10-digit ID number, three user characters, and 3-6 digit meter reading.
<b>firmware</b>	Software program or set of instructions programmed on a hardware device. It provides the necessary instructions for how the device communicates with the other computer hardware.
<b>function button</b>	Button that allows you to enter special characters in a screen.
<b>icon</b>	Small graphic that represents a program or function.
<b>letter/character keys</b>	Keys on the keypad of the handheld that allow you to enter a letter or a character in the handheld display. Letter/character keys are the smaller, rectangular keys on the bottom portion of the keypad.
<b>meter number</b>	Number by which a utility identifies a meter.

<b>MIU ID</b>	Abbreviation for <i>meter interface unit identifier</i> , which is a discrete number used to identify a specific meter interface unit.
<b>modem</b>	Device that allows two computers to communicate via telephone lines by modulating and demodulating the signals from each. The name modem is a contraction of the words <i>modulate</i> and <i>demodulate</i> .
<b>number keys</b>	Keys that allow you to access accounts while reading meters. Number keys are the larger, rectangular keys on the bottom portion of the keypad.
<b>packets</b>	Unit of data that is routed between an origin and a destination on the Internet, such as reading packets.
<b>password</b>	Unique identifier received from your system administrator that allows you to access the FST software.
<b>ProRead</b>	Register that provides the actual direct reading of the register odometer and provides error-free remote electronic capability without the need for batteries. The ProRead is a fully programmable register with an ID number of up to 10 digits, three user characters, 3-6 digit meter reading and meter networking to allow connection of two registers to one remote.
<b>RSSI</b>	Received Signal Strength Indication. Measurement of the power present in a received radio signal.
<b>simulate</b>	Process of assuming the role and effects of a device and behaving like it. For example, the MIU simulator assumes the role of an MIU in order to test an R450 DC.
<b>serial cable</b>	Name of an electronic and fibre optic connector used to refer to push-pull connectors.
<b>synchronize</b>	Process of communications to send readings and route data to and from the handheld and the host computer.
<b>time beacon duty cycle</b>	Time beacon duty cycle is the time between simulated time beacons. You can set this from 2 to 20 seconds.
<b>validate</b>	Process to check or prove the validity or accuracy of a function.
<b>upload</b>	Process of sending data from the handheld to the host computer.

# Index

---

## Numerics

4450i transceiver 3-8  
4450i, successful message 3-8

## A

activate  
    definition G-1  
    FST 3-2  
    MIU 3-36  
activation device 1-3  
activation magnet 3-36  
activities to perform 2-5 to 2-6  
add site 3-1 to 3-2  
alarm mode 3-14  
application programs, defined G-1  
assembly, cable 1-3  
authorization code 3-8

## B

battery, indicator 6-1  
battery, low 6-2  
beep not heard 6-1  
button  
    green 2-4  
    power 1-4, 6-2

## C

cable  
    (right angle 1-3  
    assembly 1-3  
    N-male to N-male 1-3  
    null modem serial 3-27  
    serial to Collector (illus) 3-23, 3-25 to 3-26  
caution, high voltage 3-22  
character buttons  
    defined G-1  
    illustrated 2-2  
code, authorization 3-8  
COLL Mon tab 3-27, 3-28  
collector  
    diagnosis 3-30  
    monitor 3-27  
    test 3-18 to 3-19  
collector monitor screen 3-27  
Collector Monitor, setup 3-22

collector simulator 3-19  
collector simulator screen 3-20  
collector, simulator 3-19  
communication cradle  
    connection 6-1  
    defined G-1  
communications  
    collector 3-21  
    Field Service Tool 3-11  
    MIU 3-21  
ConfigProg tab 3-10, 3-12, 3-13  
configuration packet 3-18, 3-20, 3-36  
configuration programming 3-12  
connector, dB9 with red stripe (illus) 3-23, 3-25 to 3-26  
contacting customer support 1-5  
continuous leak 3-14  
conventions, used in the manual 1-1  
cradle, communication 6-1  
customer support 1-5, 6-1  
customer support, contact 1-5  
cycle, time beacon duty 3-20, G-2  
cycles, defined G-1

## D

dB9 connector with red stripe (illus) 3-23, 3-25 to 3-26  
debug MIU 3-19  
debugging MIU 3-19  
device, activation 1-3  
diagnosis, log from collector 3-30  
diagnostic message 3-30  
display contrast weak 6-2  
display, problems with 6-1, 6-2  
downloading information, see sending and receiving information

## E

exit 3-1  
exit FST 3-35  
exit icon 3-35  
exit the software 3-35

## F

F1 key 6-1  
features, keyboard 2-2

- Field Service Tool
    - communications 3-11
    - exit 3-35
    - locks up 6-2
    - manually turn off 3-35
    - program 3-2 to 3-5
    - setup 3-2
  - file
    - HR4450i update 3-34
    - log 3-5
    - MIU Update 3-34
  - file, log 3-1, 3-6
  - firmware
    - defined G-1
    - MIU version 3-8
    - upgrade HR4450i 3-34
    - version 1-5, 2-3, 3-8
  - function keys, defined G-1
  - functions, to perform 2-5 to 2-6
- G**
- green button 2-4
- H**
- handheld
    - requirements 2-1
    - turn off 3-35
  - hardware tab 1-4
  - high side, single port 3-14
  - high voltage, caution 3-22
  - HR4450i
    - update screen 3-34
    - update tab 3-34
  - HR4450i update file 3-34
  - HR4450i update screen 3-34
  - HR4450i update tab 3-34
- I**
- icon
    - definition G-1
    - exit 3-35
    - used in manual 1-1
  - indicator, battery 6-1
  - install, MIU 3-10 to 3-12
  - installation, setup screen 2-5
- K**
- key, site 3-5
  - key, torx L- 1-3
  - key, tubular head 3-22
  - keyboards
    - character keys (illus.) 2-2
    - direction keys (illus.) 2-2
    - function keys (illus.) 2-2
    - quick keys (illus.) 2-2
  - kit
    - Field Service Tool 6-3
    - for troubleshooting 6-3
- L**
- large reverse flow 3-14
  - last location 3-7
  - layout, of screens 3-1
  - leak, continuous 3-14
  - letter keys
    - defined G-1
    - illustrated 2-2
  - location
    - last 3-7
    - new 3-8
  - location, for log file 3-6
  - log file 3-5, 3-6
  - log file tab 3-1
  - log file, set up 3-5 to 3-6
  - low side, single port 3-14
- M**
- magnet 1-3
  - magnet, to activate MIU 3-36
  - maintain password 3-6
  - manually turn off Field Service Tool 3-35
  - measure RSSI 3-15
  - meter numbers, defined G-1
  - Microsoft.NET Compact Framework 2-1
  - MIU 3-13
    - acknowledgments enabled 3-20
    - activate 3-36
    - configuration programming 3-12
    - debug 3-19
    - debugging 3-19
    - field update screen 3-31
    - firmware version 3-8



**MIU (continued)**

- ID 3-9
- install 3-10 to 3-12
- magnet to activate 3-36
- program 3-12, 3-14, 3-15
- query 3-13
- reset 3-9
- sim tab 3-18
- simulate 3-18 to 3-19
- simulator 3-18
- simulator node 3-18
- swipe 3-36
- test 3-36
- update file 3-34
- update tab 3-31

**MIU ID**

- defined G-2
- display 3-10, 3-11
- version number 3-9, 3-12

**mode**

- alarm 3-14
- MIU simulator 3-18
- normal 3-14
- RF test 3-18, 3-21
- user profile 3-14

modems, defined G-2

monitor collector 3-27

**N**

Neptune HR4450i radio 3-34

new location 3-8

normal mode 3-14

null modem serial cable 3-27

number keys

- defined G-2

- illustrated 2-2

**O**

operate, Field Service Tool 3-1

operating mode, determine current 3-13

operations to perform 2-5 to 2-6

**P**

packet

- configuration 3-18, 3-20, 3-36

- MIU acknowledgment 3-20

- reading 3-18

- transmit 3-19

packets

- definition G-2

- reading 3-10

password screen 3-7

password, defined G-2

password, maintain 3-6

PC requirements 2-1

power button 1-4, 6-2

power cycling, collector 3-30

problem

- beep not heard 6-1

- dark background 6-2

- display contrast weak 6-2

- does not refresh in cradle 6-1

- does not turn off 6-2

- Field Service Tool does not turn on 6-2

- handheld locks 6-2

- no response 6-2

program MIU 3-12, 3-14, 3-15

program tab 3-1

program, Field Service Tool 3-2 to 3-5

programmer, start 2-3

programming, start 2-3

**Q**

query MIU 3-13

quick install results 3-11

quick install tab 3-10

quit 3-35

**R**

R450 Data Collector 3-19, 3-21

R450 Data Collector simulator 3-19

radio, Neptune HR4450i 3-34

reading

- packet 3-18

- register 3-36

- reading packets 3-10
- Received Signal Strength Indication (See RSSI) 3-15
- register reading, sent to Collector 3-36
- required equipment, for Collector Monitor 3-22
- requirements
  - handheld 2-1
  - Microsoft NET 2-1
  - PC 2-1
  - system 2-1
- reset MIU 3-9
- restart, after HR4450i update 3-34
- results, quick install 3-11
- reverse flow 3-14
- RF Link, between MIU and collector 3-10
- RF Test mode 3-17
- RF test mode. use 3-18, 3-21
- RSSI
  - definition G-2
  - measure 3-15
- RSSI, measure 3-15
- S**
- screens
  - activities 3-1
  - collector monitor 3-27
  - collector simulator 3-20
  - HR4450i update 3-34
  - layout 3-1
  - MIU field update 3-31
  - MIU programming 3-13
  - MIU simulator 3-18
  - password 3-7
  - quick install 3-10
  - RF Test Mode 3-17
  - RSSI 3-16
  - setup 2-5
  - start 2-3
  - tabs 3-1
  - tasks 3-1
- screwdriver, required 1-3
- select site 3-4
- serial cable G-2
  - end (illus) 3-23, 3-25, 3-26
- serial to Collector cable (illus) 3-23, 3-25, 3-26
- set time beacons 3-20
- set up Collector Monitor 3-22
- set up FST 3-2
- setup screen 2-5
- simulate
  - definition G-2
  - MIU 3-18
- simulate collector 3-19 to 3-21
- simulate MIU 3-18 to 3-19
- simulator
  - collector 3-19
  - MIU 3-18
- single port/high side 3-14
- single port/low side 3-14
- site
  - add 3-2
  - key 3-5
  - select 3-4
- site tab 3-1, 3-4
- small reverse flow 3-14
- software
  - exit 3-35
  - finding version number 1-3
  - start 2-3
- support
  - contact 6-1
  - specialist 6-1
- support, contact 1-5
- swipe MIU 3-36
- symbols, used in manual 1-1
- synchronize, defined G-2
- system requirements 2-1
- system, operating 2-1
- T**
- tabs
  - add site 3-1
  - collector monitor 3-27, 3-28
  - ConfigProg 3-12
  - exit 3-1
  - hardware 1-4
  - HR4450i update 3-34
  - log file 3-1
  - measure RSSI 3-15
  - MIU sim 3-18
  - MIU simulator 3-18
  - MIU update 3-31
  - on screen 3-1

- 
- tabs (continued)
    - program 3-1
    - quick install 3-10
    - site 3-1, 3-4
  - tasks, illustrated on screen 3-1
  - technical support 1-5
  - temperature exposure 6-2
  - test collector 3-18 to 3-19
  - test MIU 3-36
  - Time 3-20
  - time beacon duty cycle 3-20, G-2
  - time beacons, set 3-20
  - toolbar 3-1
  - torx L-key 1-3
  - transmit, packet 3-19
  - troubleshooting
    - display 6-1, 6-2
    - kit, Field Service Tool 6-3
    - nonresponsive unit 6-1, 6-2
    - problems, with kit 6-3
    - turning off, problems with 6-2
    - unit nonresponsive 6-2
    - unit won't turn off 6-2
  - tubular head key 1-2, 3-22
  - two-way communications, between MIU and collector 3-21
- U**
- upgrade firmware, on HR4450i 3-34
  - uploading, defined G-2
  - use RF test mode 3-18, 3-21
  - user profile mode 3-14
- V**
- validate
    - definition G-2
    - RF link 3-10
  - vehicle charging kit 1-2
  - version
    - firmware 3-8
    - MIU firmware 3-8
- W**
- Windows CE operating system 2-1

*Notes:*



Neptune Technology Group Inc.  
1600 Alabama Highway 229  
Tallassee, AL 36078  
USA  
Tel: (800) 633-8754  
Fax: (334) 283-7293

Neptune Technology Group (Canada) Ltd.  
7275 West Credit Avenue  
Mississauga, Ontario  
L5N 5M9  
Canada  
Tel: (905) 858-4211  
Fax: (905) 858-0428

Neptune Technology Group Inc.  
Ejército Nacional No. 418  
Piso 12, Desp. 1201-1202  
Col. Chapultepec Morales  
Delegación Miguel Hidalgo  
11570 México, Distrito Federal  
Tel: (525) 55203 5294 / (525) 55203 5708  
Fax: (525) 55203 6503



**NEPTUNE**  
TECHNOLOGY GROUP  
TAKE CONTROL  
[neptunetg.com](http://neptunetg.com)