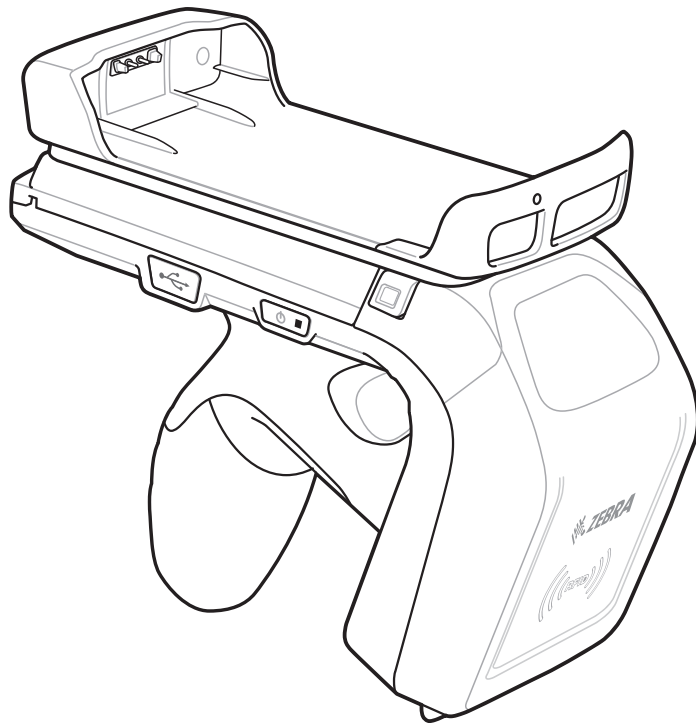


# RFD8500i USER GUIDE





# **RFD8500i USER GUIDE**

MN-002761-01

Revision A

September 2016

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## Warranty

For the complete Zebra hardware product warranty statement, go to:

<http://www.zebra.com/warranty>.

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## Revision History

Changes to the original manual are listed below:

Change	Date	Description
-01 Rev A	9/2016	Initial Release

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# ABOUT THIS GUIDE

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## Introduction

The RFD8500i reader provides Radio Frequency Identification (RFID) capabilities and is purpose-built to work with TC55 mobile computer. The unit can be used stand alone, or paired with a TC55 via NFC or Bluetooth®.

This guide provides information on using the RFD8500i and its accessories.



**NOTES** Some screens or windows shown in this guide may differ from the actual screens shown on the device.

This guide refers to screens and features from the Zebra RFID Mobile application. Refer to the corresponding feature in the partner application you are using.

---

## Related Documents

- RFD8500 RFID Developer Guide, p/n MN002222AXX.
- RFD8500i Quick Start Guide, p/n MN-002760-XX.
- RFD8500i Regulatory Guide, p/n MN-002856-XX.
- CRD1S-RFD8500 (1-Slot), CRDUNIV-RFD8500-1R (3-Slot), CRD4S-RFD8500 (4-Slot), Universal Charge Only Cradles Regulatory Guide, p/n MN002224AXX.
- TC55 User Guide, p/n MN000015AXX.

## Configurations

**Table ii-1** *RFD8500i*

<b>Configuration</b>	<b>Description</b>
RFD8500-1500100-US	BT sled, US
RFD8500-1500100-EU	BT sled, EU
RFD8500-1500100-JP	BT sled, Japan
RFD8500-1500100-IL	BT sled, Israel
RFD8500-1500100-IN	BT sled, India

**Table ii-2** *Cradle Accessories*

<b>Item</b>	<b>Part Number</b>
Power Supply for 1-slot cradle	PWRS-14000-148R
Power Supply for 4-slot cradle	PWRS-14000-241R
DC Line Cord for power supply 241R	50-16002-029R
AC Line Cord for power supply 148R and 241R: US	23844-00-00R
AC Line Cord for power supply 148R and 241R: Australia, China, New Guinea	50-16000-217R
AC Line Cord for power supply 148R and 241R: Japan	50-16000-218R
AC Line Cord for power supply 148R and 241R: Hong Kong, Iraq, Malaysia, Singapore, United Kingdom	50-16000-219R
AC Line Cord for power supply 148R and 241R: Europe, Abu Dhabi, Bolivia, Dubai, Egypt, Iran, Korea, Russia, Vietnam.	50-16000-220R
AC Line Cord for power supply 148R and 241R: United States	50-16000-221R
AC Line Cord for power supply 148R and 241R: Korea.	50-16000-256R
AC Line Cord for power supply 148R and 241R: China	50-16000-257R
AC Line Cord for power supply 148R and 241R: India	50-16000-669R
AC Line Cord for power supply 148R and 241R: Italy	50-16000-671R
AC Line Cord for power supply 148R and 241R: Israel	50-16000-672R
4-way DC Cable for 4-slot cradle (optional)	25-85992-01R
2-way DC Cable 4-slot cradle (optional)	25-122026-02R

---

## Chapter Descriptions

This guide includes the following topics:

- *Chapter 1, GETTING STARTED* provides an overview of RFD8500i physical features, device illustrations and the how to get the Zebra RFID Mobile application.
- *Chapter 2, USING the RFD8500i* describes the basic operations of RFD8500i including device behavior, Bluetooth pairing and RFID features.
- *Chapter 3, ZEBRA RFID MOBILE APPLICATION for ANDROID* details the features of the Zebra RFID Mobile application for Android.
- *Chapter 4, 123SCAN* includes an overview of the 123Scan utility.
- *Appendix A, TROUBLESHOOTING, TECHNICAL SPECIFICATIONS and MAINTENANCE* includes RFD8500i specifications, and information about troubleshooting and maintaining the reader.

---

## Notational Conventions

This document uses the following conventions:

- *Italics* are used to highlight chapters, screen names, fields, and sections in this and related documents.
- bullets (•) indicate:
  - Action items
  - Lists of alternatives
  - Lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.



**NOTE** This symbol indicates something of special interest or importance to the reader. Failure to read the note will not result in physical harm to the reader, equipment or data.



**CAUTION** This symbol indicates that if this information is ignored, the possibility of data or material damage may occur.



**WARNING!** This symbol indicates that if this information is ignored the possibility that serious personal injury may occur.

---

## Service Information

If you have a problem using the equipment, contact your facility's technical or systems support. If there is a problem with the equipment, they will contact the Zebra Technologies Global Customer Support Center at: <http://www.zebra.com/support>.

When contacting Zebra support, please have the following information available:

- Product name
- Version number
- Serial number

Zebra responds to calls by e-mail, telephone or fax within the time limits set forth in support agreements.

If your problem cannot be solved by Zebra support, you may need to return your equipment for servicing and will be given specific directions. Zebra is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

If you purchased your business product from a Zebra business partner, contact that business partner for support.

# Chapter 1 GETTING STARTED

---

## Introduction

This chapter provides the features of the RFD8500i and explains how to set it up for the first time.

---

## Unpacking

Carefully remove all protective material from the RFD8500i and save the shipping container for later storage and shipping. Verify the following items are in the box:

- RFD8500i
- 4410 mAh Lithium-ion battery
- Micro USB cable
- Quick Start Guide (not included in Beta package)
- Regulatory Guide (not included in Beta package).

Inspect the equipment for damage. If any equipment is missing or damaged, contact the Zebra Support Center immediately. See [Service Information on page viii](#) for contact information.

## RFD8500i Features

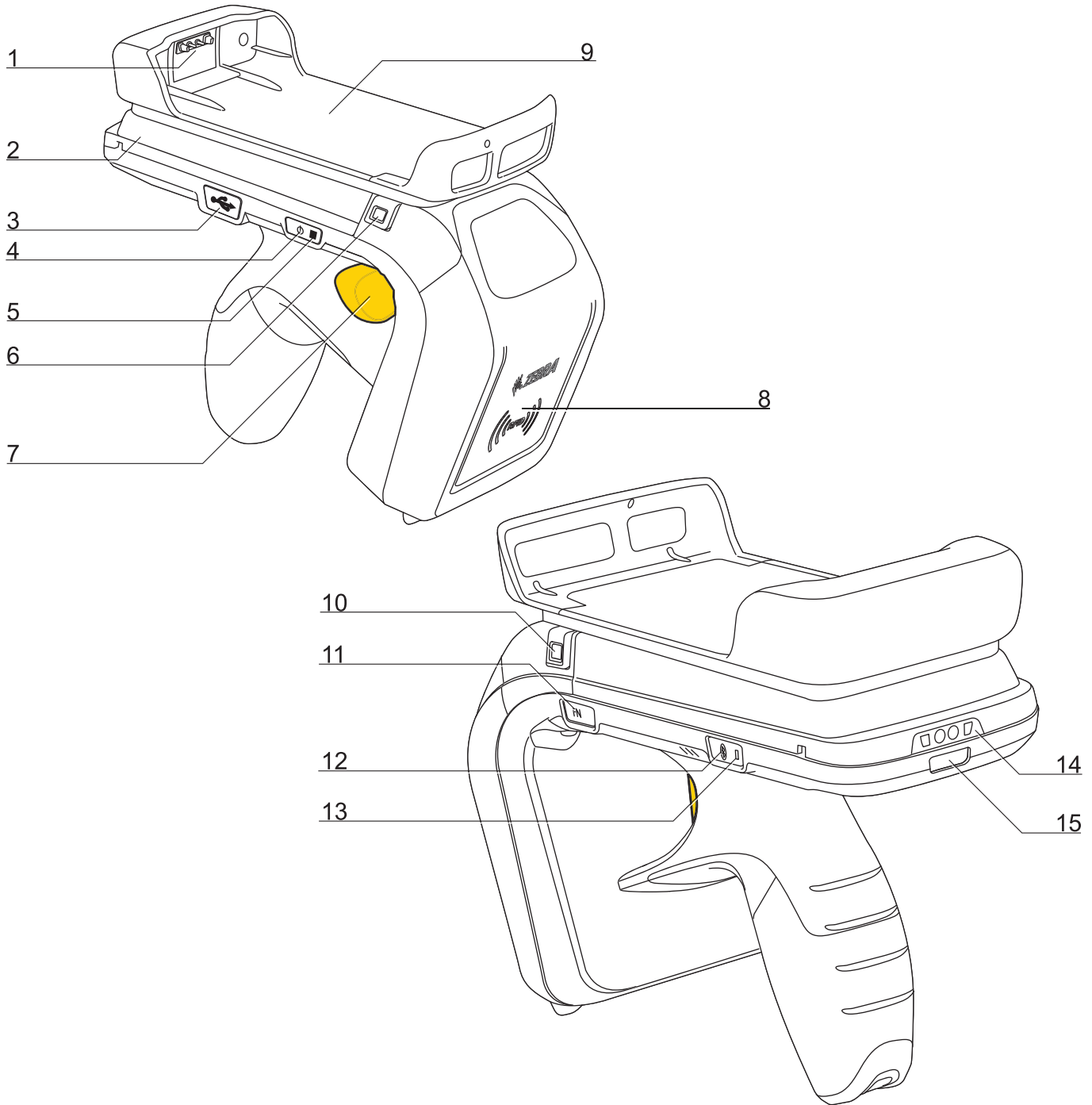


Figure 1-1 Features of the RFD8500i

See [Trigger and Button Operations on page 2-1](#) for more information about using the features.

**Table 1-1** Feature Descriptions

Number	Item	Description
1	Mobile Computer Contacts	Connects the mobile computer to the RFD8500i to charge the mobile computer in the charging accessory.
2	Battery Cover/Compartment	Battery cover for the RFD8500i battery.
3	USB Port/Cover	USB port.
4	Power Button	Turns the RFD8500i on and off.
5	Power/Charging Indicator	Reflects the power state of the RFD8500i. See <a href="#">LED and Beeper Indicators on page 2-2</a> for indicator descriptions.
6	Battery Cover Release Button	Depress buttons (items 6 and 10) to remove the battery cover.
7	Trigger	Press to read tags.
8	RFID Antenna Compartment	Houses RFID antenna.
9	Mobile Computer Tray	Tray holds/secures the TC55 mobile computer.
10	Battery Cover Release Button	Depress buttons (items 6 and 10) to remove the battery cover.
11	Function Button	This button should be used by System Administrators only. It halts the boot process when pressed in conjunction with the <b>Power</b> button. Halting the boot process allows the system engineer to recover devices with an improper firmware image (i.e, devices that cannot boot up). Press <b>Mode</b> and <b>Bluetooth</b> buttons simultaneously for three seconds to perform a soft reset.
12	Bluetooth Button	Turns Bluetooth on and off, and enables discover mode.
13	Bluetooth Indicator	Indicates the Bluetooth status.
14	Charging Contacts	Connects to a charging accessory.
15	Operation Indicator	

## Setting Up the RFD8500i

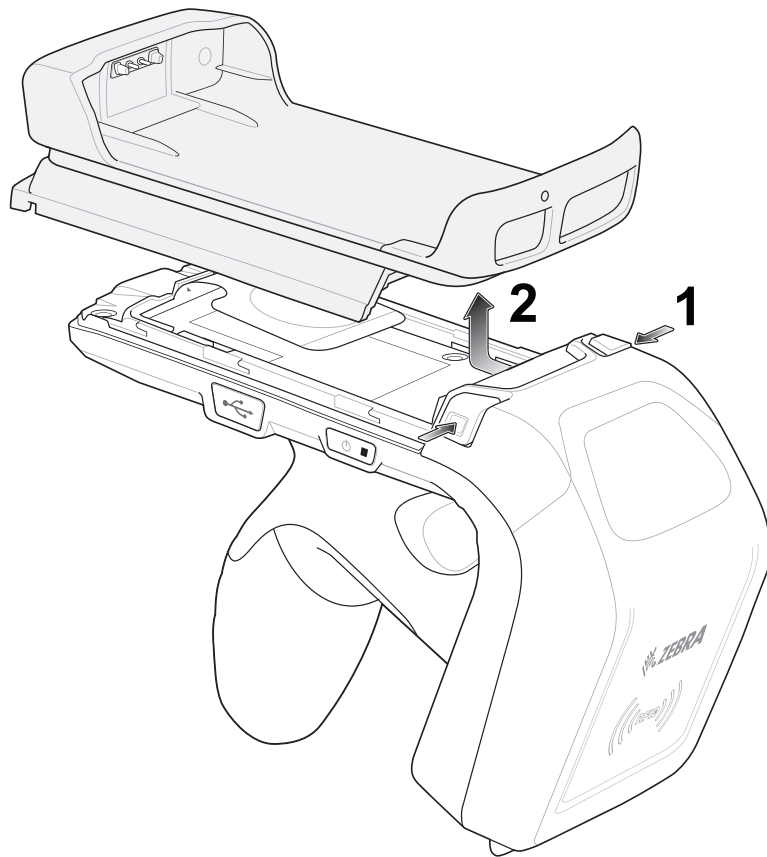
To start using the RFD8500i for the first time with the TC55:

- Install the battery.
- Charge the RFD8500i.
- Power on the RFD8500i.
- Pair the RFD8500i to the TC55 via Bluetooth or NFC.
- Install the Android Demo Application, or the partner application.
- Set the region and power level (using the Demo Application, or the partner application).

### Installing the Battery

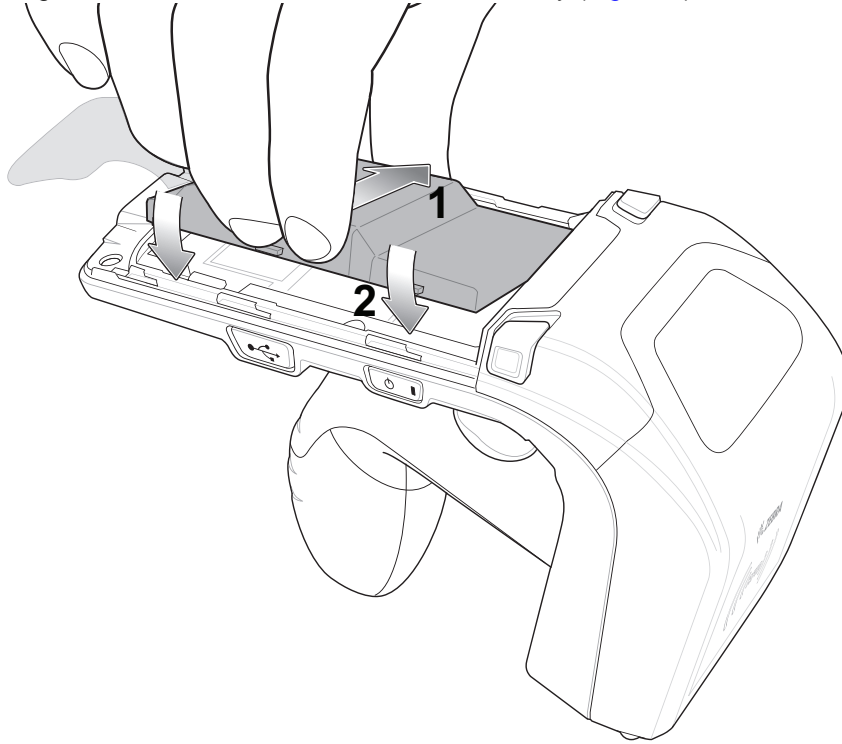
To install the battery:

1. Depress both battery cover release buttons.
2. Slide back, and remove battery cover.



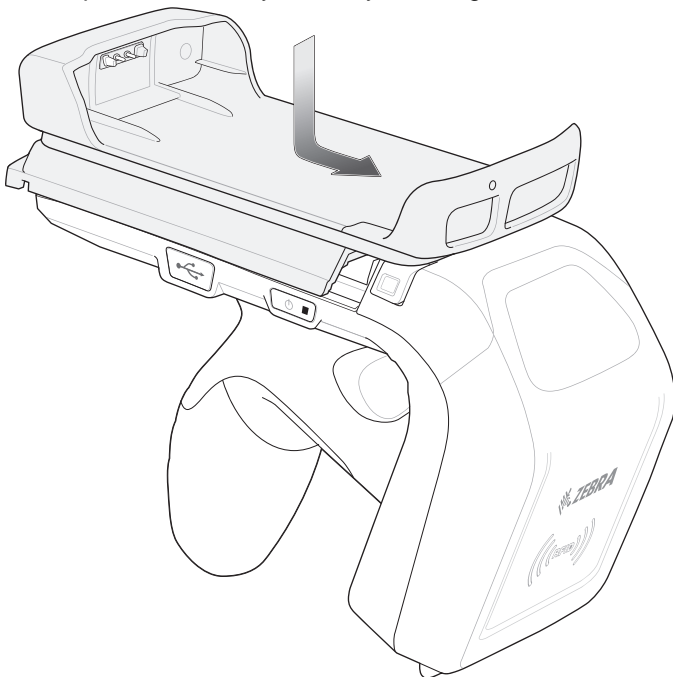
**Figure 1-2** Removing the Battery Cover

3. Align the three tabs on the bottom of the battery (*Figure 5*) with the three slots in the battery compartment.



**Figure 1-3** *Inserting the Battery*

4. Press the battery down and rotate until it locks into place.
5. Replace the battery cover by lowering the cover over the battery and sliding it forward until it locks in place.



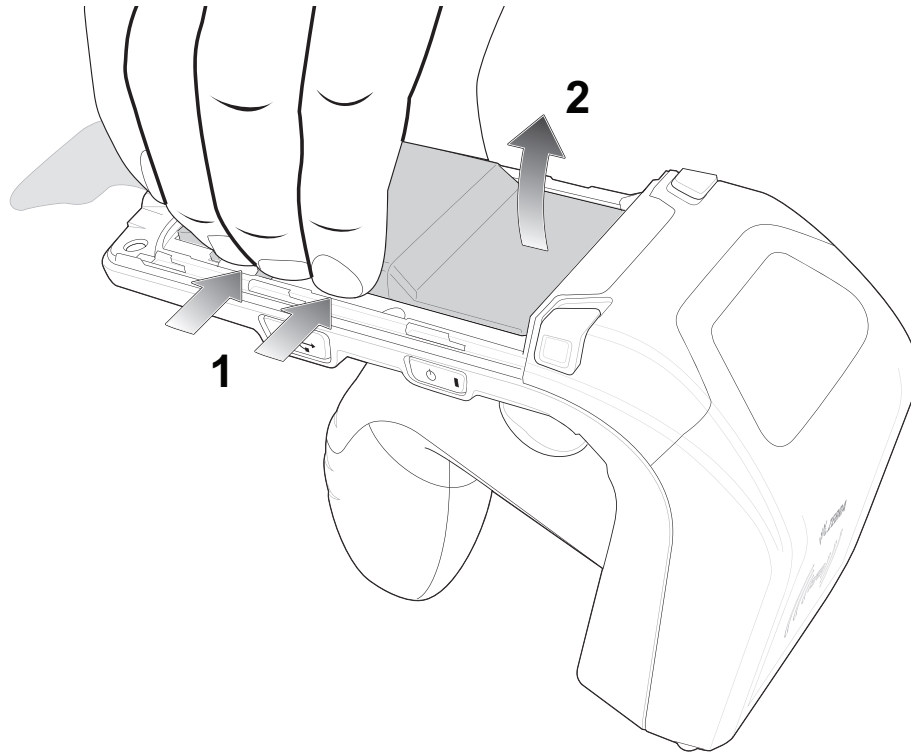
**Figure 1-4** *Replacing the Battery Cover*

6. The RFD8500i automatically powers on when the battery is in place.

## Removing the Battery

To remove the battery:

1. If powered on, press the **Power** button to power off the RFD8500i.
2. Remove the battery cover as shown in [Figure 1-2 on page 1-4](#).
3. Use your fingers to press the battery down.



**Figure 1-5** *Removing the Battery*

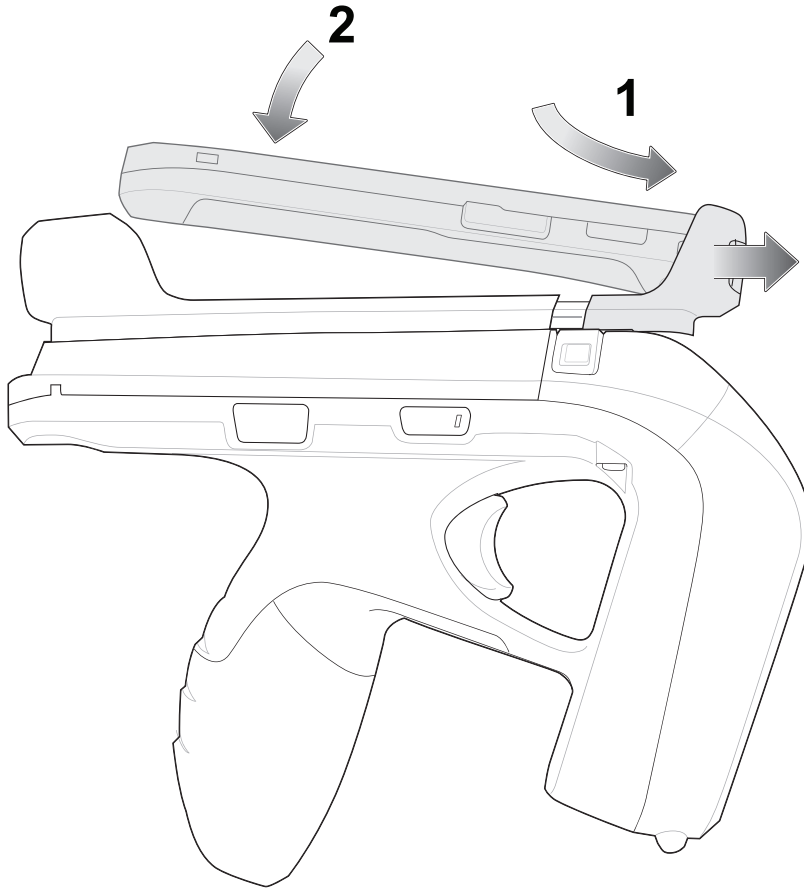
4. Rotate the battery out of the compartment.
5. Replace the battery cover as shown in [Figure 1-4 on page 1-5](#).
6. The RFD8500i automatically powers on when the battery is in place.

---

## Inserting the TC55 on the RFD8500i

To insert the TC55:

1. Insert the top of the TC55 into the front of the mobile computer tray. The tray expands slightly.



**Figure 1-6** *Inserting the TC55*

2. Lower the TC55 into the back of the mobile computer tray. The tray contracts and the mobile computer locks into place.

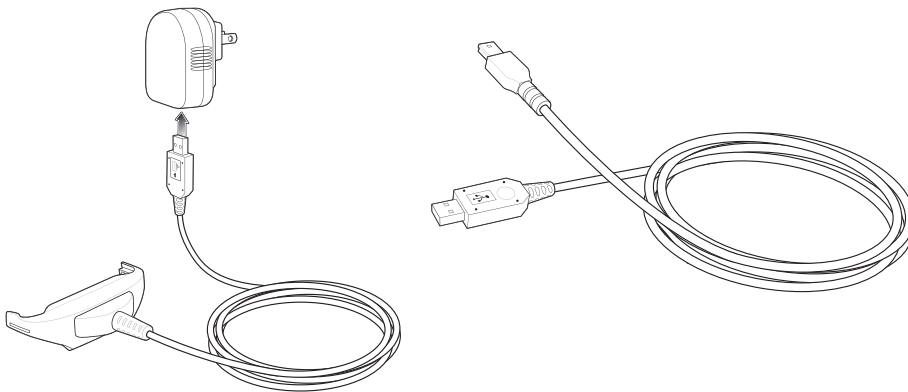
## Charging

Before using the RFD8500i for the first time, charge the battery until the LED Power/Charging Indicator turns solid green. To charge the RFD8500i, use the Micro USB cable, cup charger, or cradles. The One Slot and Four Slot Charge Only cradles can be used to charge any combination of devices including the RFD8500i and TC55.

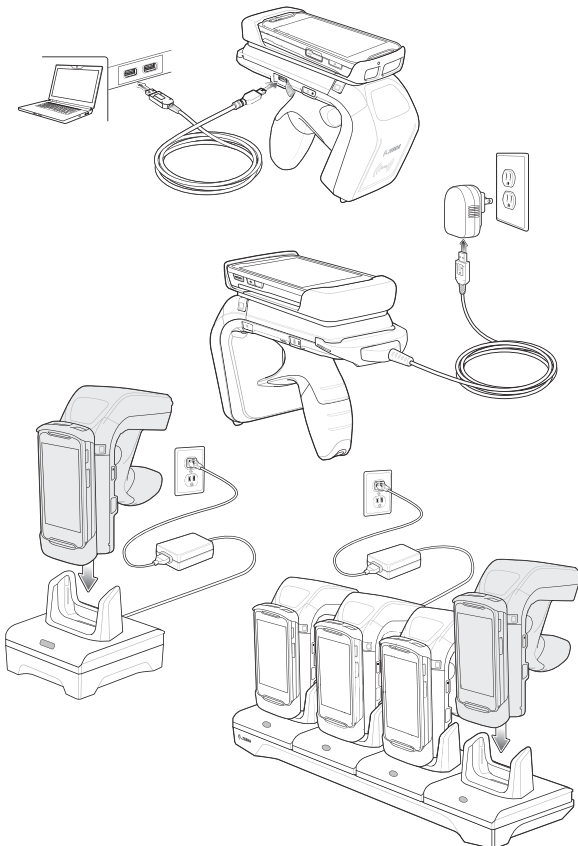
### Charging the Battery in the Reader



**CAUTION** Ensure that you follow the guidelines for battery safety described in [Battery Management on page 1-9](#).



**Figure 1-7** Charging Accessories - AC Charge Cable and USB Cable.



**Figure 1-8** Charging Accessories - AC Charge Cable, USB Cable, One Slot Cradle, and Four Slot Cradle

## Charging the Mobile Device Battery

Follow the instructions in the mobile device User Guide for charging the battery in the mobile device.

## Charging Temperature

Charge batteries in temperatures from 0° C to 40° C (32° F to 104° F). The RFD8500i indicates when charging is disabled due to abnormal temperatures via its power LED.

✓ **NOTE** For safety reasons, ensure that the battery cover is properly installed.

When the battery is properly installed, the reader powers on and the power LED turns solid green.

---

## Battery Management

Prior to checking the battery charge level, remove the RFD8500i from any AC power source (cradle or cable). To check the charge status of the main battery, the RFD8500i should be connected to the mobile computer over Bluetooth. When connected, run the appropriate Zebra RFID Mobile application and select *Settings > Battery Status*.

Battery status indicates that the battery is discharging and the battery level indicates the battery charge (as a percentage of fully charged). If using the partner application, refer to the partner application documentation.

## Low Battery Notification

When the reader has 20% battery remaining, the power LED becomes solid amber. No beeps sound.

When the battery State of Charge (SOC) is equal or less than 10%, the power LED is solid red and short beep sounds repeat **ONLY** when the device is **NOT** connected to a charger **AND** when the unit is active (not in low power mode, or off mode).

When the reader has 5% battery remaining, the reader sounds high, medium, low beeps before automatically powering off.

## Battery Optimization

The RFD8500i supports intelligent performance and battery optimizations for your application needs. An API is available to enable this setting. For more information refer to the RFD8500 RFID Developer Guide, p/n MN002222AXX.

---

## Downloading Application Software

### Zebra RFID Mobile Application for Android

#### Requirements

- The recommended Android version on the mobile computer is Kit Kat version 4.4.x.
- Zebra Enterprise mobile computer - TC55.

#### Installing the Software

Install the Zebra RFID Mobile application for Android (or partner application) on the mobile computer from the Zebra website. The procedure to install the software in an Android device depends on the Android version.

To install the software:

1. Connect the Android device to your computer. It should be connected as *MTP Device* and should show as a drive on your computer.
2. Go to *Device Settings > Security* and check *Unknown Sources* to allow installation of applications from unknown sources.
3. Copy the .apk file to the mobile device.
4. Go to *Settings > Security* and select *Unknown sources*.
5. Use *File Manager* to locate the .apk file in the folder to which you copied it in [Step 3.](#), and select it.
6. In the pop-up window, select the *Android App* installer.
7. The installation begins.
8. Before using the application, pair the Android device using the Android *BT Settings* (see [Pairing With the TC55 Using NFC on page 2-4](#)). Pairing is initiated by the Android device.

# Chapter 2 USING the RFD8500i

---

## Introduction

This chapter includes information about LED and beeper indicators, NFC based Bluetooth connections and Bluetooth connections.

---

## Using the Features on the RFD8500i

### Using Buttons and the Scan Trigger

[Table 2-1](#) shows the functions of the RFD8500i buttons and scan trigger.

**Table 2-1** *Trigger and Button Operations*

Option	Scan Trigger	Power Button	BT Button	Comments
Start/Stop RFID Tag Read	X			n/a
Turn RFD8500i ON/OFF		X		Hold the <b>Power</b> button for three seconds to turn the RFD8500i OFF. Press the <b>Power</b> button again to turn the RFD8500i ON.
Enable Bluetooth			X	Hold the <b>Bluetooth</b> button for one second to turn on Bluetooth discovery. See <a href="#">Pairing With the TC55 Using NFC on page 2-4</a> for more information.
Disconnect Bluetooth			X	When connected with a mobile device, hold the button for one second to disconnect from the current device and return it to discovery mode to connect with another device.

**Table 2-1** *Trigger and Button Operations (Continued)*

Option	Scan Trigger	Power Button	BT Button	Comments
Turn Off Bluetooth			X	Hold the button for five seconds to turn off Bluetooth.
Soft Reset the RFD8500i			X	Hold the <b>Function</b> and <b>Bluetooth</b> buttons simultaneously for three seconds, then release to initiate the reset process.
Reset Device to Factory Defaults		X	X	Hold the <b>Power</b> and <b>Bluetooth</b> buttons simultaneously for five seconds, then release to initiate the factory reset process.

## LED and Beeper Indicators

The LED and beeper indicators provide an indication of the operating statuses of the RFD8500i. (See [RFD8500i Features on page 1-2](#) for the location of indicators.)

**Table 2-2** *Status Indicators*

Condition	Power LED	Beeper
<b>Power State Indicator (Power Button)</b>		
Low battery (20%)	Solid amber	No beep
Lower battery (10%)	Solid red	Short beep sounds repeated
Suspend	Solid red, then turn off	High/medium/low
Charging	Blinking amber	Short beep when charger is connected
Charged	Solid green	One beep
Charging error	Fast blink red	Three beeps
Power on	Green if battery charge > 20% Amber if battery charge is between 10% - 20% Red if battery charge < 10%	Low/medium/high beeps
<b>Decode/RFID Read Indicator</b>		
Good decode	Solid green	Short low beep
Transmit error	Solid amber for 2 seconds	Four beeps for RFID read
Good RFID read	Solid green (for each read)	Short medium beep
RFID error	Amber	No beep
Other error message	Solid red	No beep
<b>BT Indicator (BT Button)</b>		
BT off	Off	No beep

**Table 2-2** Status Indicators (Continued)

Condition	Power LED	Beeper
BT on/not connected	Slow flash	No beep
BT discoverable	Medium flash	No beep
BT on/pairing in process	Fast flash	No beep
BT application connected	Solid blue	Short low high beep
BT out of range	Slow flash	Short high low beep

## Near Field Communication (NFC) Based BT Connection

NFC is a set of communication protocols that enable two electronic devices to establish communication by bringing them close to each other.

NFC facilitates quick and seamless pairing and connection of the RF8500i with a TC55 using the Bluetooth address of the reader.

For more details refer to the Bluetooth SIG Bluetooth Secure Simple Pairing Using NFC:  
[http://members.nfc-forum.org/apps/group\\_public/download.php/18688/NFCForum-AD-BTSSP\\_1\\_1.pdf](http://members.nfc-forum.org/apps/group_public/download.php/18688/NFCForum-AD-BTSSP_1_1.pdf).

See *Chapter 3, ZEBRA RFID MOBILE APPLICATION for ANDROID* for Android documentation related to NFC.

## General NFC Application Implementation

RFD8500i NFC tags are programmed with `application/zeb.bluetooth.ep.oob` custom mimetype but it is fully Bluetooth format compliant NFC forum type 2 (includes BT device address and friendly name).

The application can define the intent filter in the launcher activity to automatically launch whenever an NFC tag is read by the RFD8500i reader.

```
<intent-filter>
    <action android:name="android.nfc.action.NDEF_DISCOVERED"/>
    <category android:name="android.intent.category.DEFAULT"/>
    <data android:mimeType="application/zeb.bluetooth.ep.oob"/>
</intent-filter>
```

Also it can setup a foreground dispatcher to capture all NFC tag read events whenever the application is in the foreground.

## Pairing With the TC55 Using NFC

Pairing with the RFD8500i is completed from the Android Platform via *Settings* on the TC55. See [Pairing on page 3-2](#) for additional information.

Prior to pairing the RFD8500i with the TC55 ensure the RFD8500i is charged.



**IMPORTANT** For successful pairing of the RFD8500i to the TC55, the yellow trigger on RFD8500i must be pressed when the RFD8500i displays in the list of available discoverable devices, and the RFD8500i Bluetooth LED starts flashing fast. See the step-by-step instructions for pairing.

To pair with the TC55:

1. Power on the TC55.
2. Touch the *Settings* icon on the mobile device.
3. Turn Bluetooth on.
4. Select **More** and ensure the check box next to NFC is checked.
5. Insert the TC55 into the Mobile Computer Tray on the RFD8500i.
6. Launch the Zebra RFID Demo app for Android or your app that supports NFC pairing (as specified in the RFD8500 RFID Developer Guide, p/n MN002222AXX).
7. The application initiates the pairing between TC55 and RFD8500i.
8. Press the RFD8500i trigger to pair when the Bluetooth LED starts flashing fast.
9. The application automatically connects to the RFD8500i and indicates when connection is complete.



**NOTE** Refer to the *TC55 User Guide*, p/n MN000015A, for detailed information about the device.

## Using the Locate Device Bar Code

The Locate Device bar code appears on the RFD8500i under the antenna compartment. When you pair several RFD8500i devices with your TC55 device via Bluetooth, use the serial number represented by the Locate Device bar code to identify a specific paired RFD8500i. The bar code can also be used for pairing. Refer to the RFD8500 RFID Developer Guide for details.

---

## Reading Tags

To read tags, see the Zebra RFID Mobile App information in [Chapter 3, ZEBRA RFID MOBILE APPLICATION for ANDROID](#).

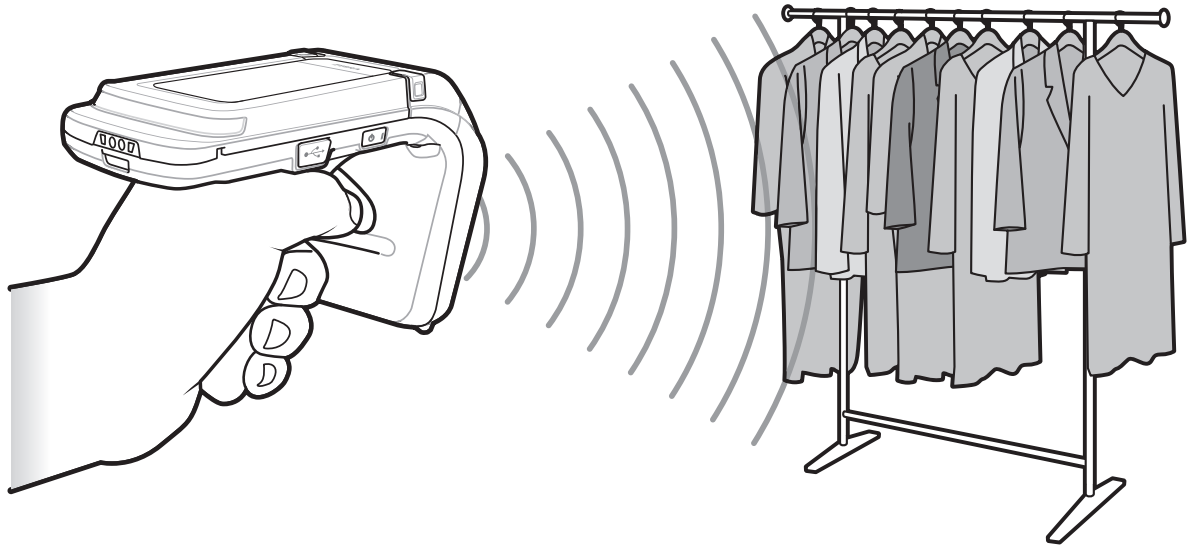


Figure 2-1 Reading Tags

---

## Transferring Data

### Transferring Data in Batch Mode

When the RFD8500i is configured to batch data, it is capable of reading RFID tag data without connection to a host device. It is recommended to stop reading functions before transferring the data via the Bluetooth interface. The *Delay before data transmission in batch mode* parameter in the 123Scan RFD8500i plug-in controls whether or not a delay should be enforced before transferring the data in HID mode. By default, this parameter is zero. RFID data is not transferred automatically in ZETI mode. Instead it has be requested by the application using the *gettags* ZETI command. For more information, refer to the Zebra RFID Mobile App for Android and the developer guide.

### Transferring Data via Bluetooth

By default, the RFD8500i operates in auto batch mode. In this mode the RFD8500i pushes RFID data after a read request is issued by the connected application. If the Bluetooth link quality degrades and breaks, the RFD8500i (in auto batch mode) is capable of moving automatically to batch mode while simultaneously allowing current RFID operations to be unaffected. If the Bluetooth connection is regained after the RFD8500i entered batch mode, see [Transferring Data in Batch Mode](#) above to offload the data acquired while the unit was operating in batch mode.



# Chapter 3 ZEBRA RFID MOBILE APPLICATION for ANDROID

---

## Introduction

This chapter describes the *Zebra RFID Mobile Application for Android* that can be used with the RFD8500i. When using a partner application, the features/functionality might vary.

This application runs on Android mobile devices and demonstrates RFD8500i capability and tag operation functionality.

The application allows the user to navigate to all screens whether or not the device is connected to the RFD8500i reader. The *Settings* screens display the application defaults when there is no connection to the reader. When not connected, an attempt to perform any operation (*Rapid Read*, *Inventory*, *Locate tag*, *Access Operations*, *Save Configuration*, *Battery Status*) displays *No Active Connection with Reader*.

The user can navigate to all screens when the inventory/locate operation is in progress. When the operation is in progress, the device displays *Operation in Progress* if additional operations are initiated.

---

## Using the Zebra RFID Mobile Application for Android

To use this application for RFID operations:

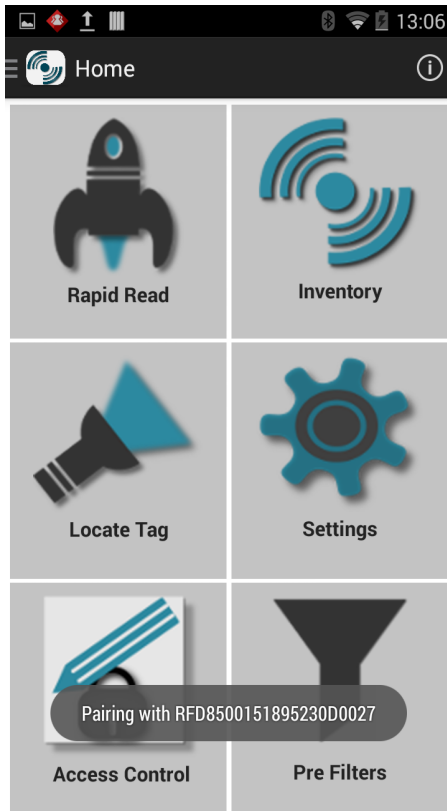
1. Ensure the *Zebra RFID Mobile Application for Android* is installed on the Android mobile device.
2. Pair the mobile device with the RFD8500i over Bluetooth (see [Pairing With the TC55 Using NFC on page 2-4](#) and [Pairing on page 3-2](#)).
3. Launch the *Zebra RFID Mobile Application for Android* on the mobile device.
4. Select *Settings > Readers List* and select the RFD8500i device to connect.
5. Return to the *Home* screen and select *Settings > Antenna*. *Power Level* is set to 27.0 dBm by default. Japan units are set to a different default power level depending on the SKU type.
6. Before using the device set the region in which the device is operating. To set the region, open the application and select *Settings > Regulatory* (see [Regulatory on page 3-19](#)).

## Pairing



**IMPORTANT** Before trying to connect/pair the reader using the NFC feature, the NFC option must be enabled from the application page and from the Android **Settings** screen.

Under typical conditions, when the RFD8500i detects an NFC tag, the demo application starts the pairing process automatically. Press the trigger on the RFD8500i to accept pairing and complete the process. There may be situations in which other conditions occur and additional user input is required to complete the pairing process (see [Pairing/Connection Scenarios](#)).



**Figure 3-1** Automatic Pairing Message

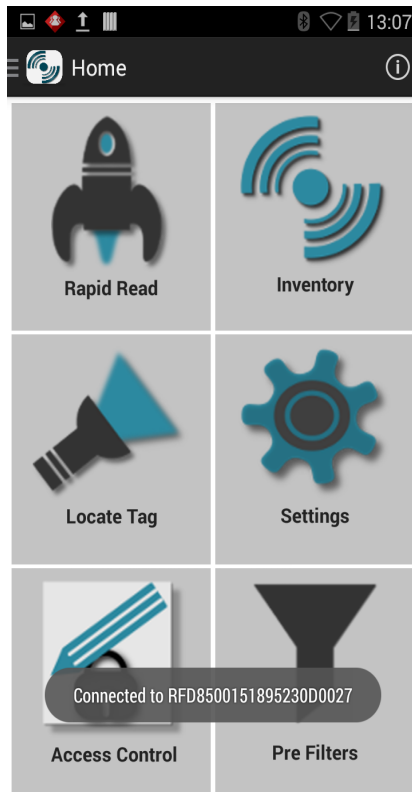
### Pairing/Connection Scenarios

The following scenarios describe circumstances that may require user input to pair/connect devices via the NFC tag.

#### ***TC55 Seated in the Mobile Computer Tray on the RFD8500i - Devices Not Paired***

1. Launch the demo application manually.
2. When the demo application detects the RFD8500i NFC tag, the application tries to connect with device.

3. Press the trigger on RFD8500 to complete connection.



**Figure 3-2** Connection Successful

### ***TC55 Not Seated in the Mobile Computer Tray on the RFD8500i - Devices Not Paired***

When the demo application runs in the foreground on the TC55, move the RFD8500i into the range of the Android device. When the demo application detects the RFD8500i NFC tag it reads the NFC tag and connects to the RFD8500i. The **Connected to...** message displays ([Figure 3-2](#)).

**RFD8500i and TC55 Paired/Connected - User Attempts to Connect Another TC55**

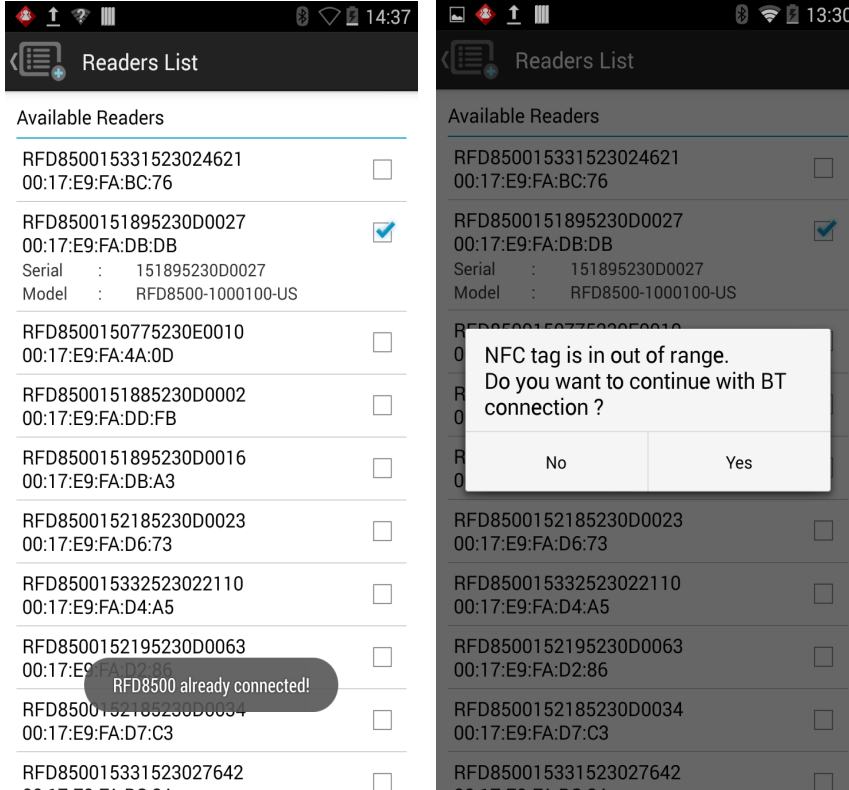
When the RFD8500i is connected to a TC55 and the user attempts to pair/connect another TC55 the dialog shown in [Figure 3-3](#) displays on the second TC55. Select **Yes** to disconnect the previously connected TC55 and connect to the new device. A disconnect message displays on the previously connected TC55.



**Figure 3-3** Connection Already Exists

**RFD8500i and TC55 Connected But Retain Bluetooth Connection**

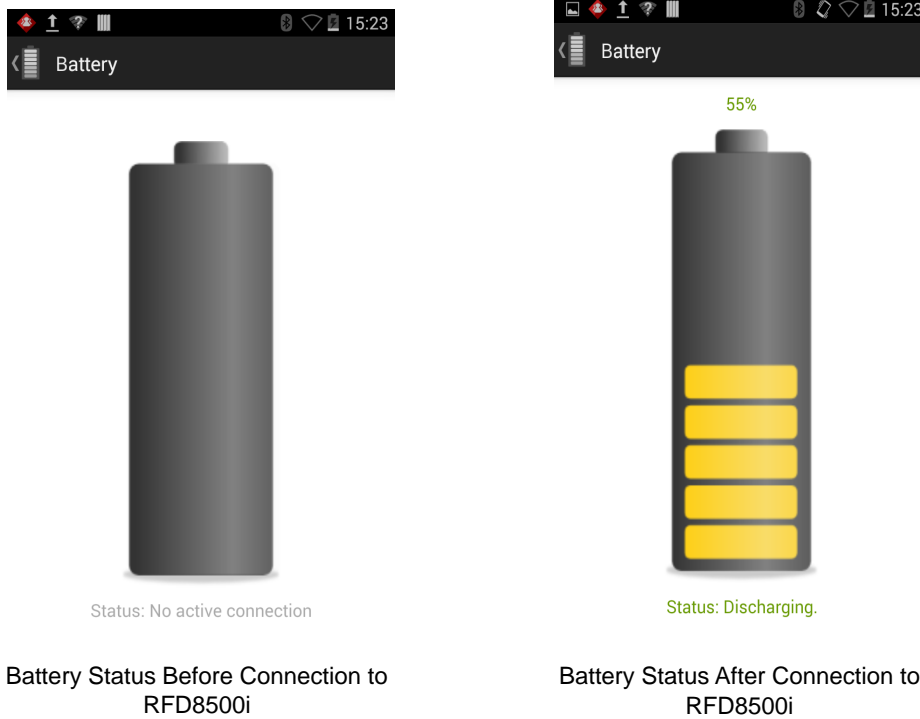
When the TC55 is removed from the RFD8500i the user has the option to either retain the Bluetooth connection or disconnect. Select **Yes** to retain the connection and select **No** to disconnect the Bluetooth connection.



**Figure 3-4** Connection Messages

## Demo Application Status Upon Connection

The user can connect to the RFD8500i from any screen within the demo application. When the connection is successful, the current screen populates with the values from the RFD8500i. For example, [Figure 3-5](#) shows the **Battery** screen before and after connection.




**Figure 3-5** Connection Statuses

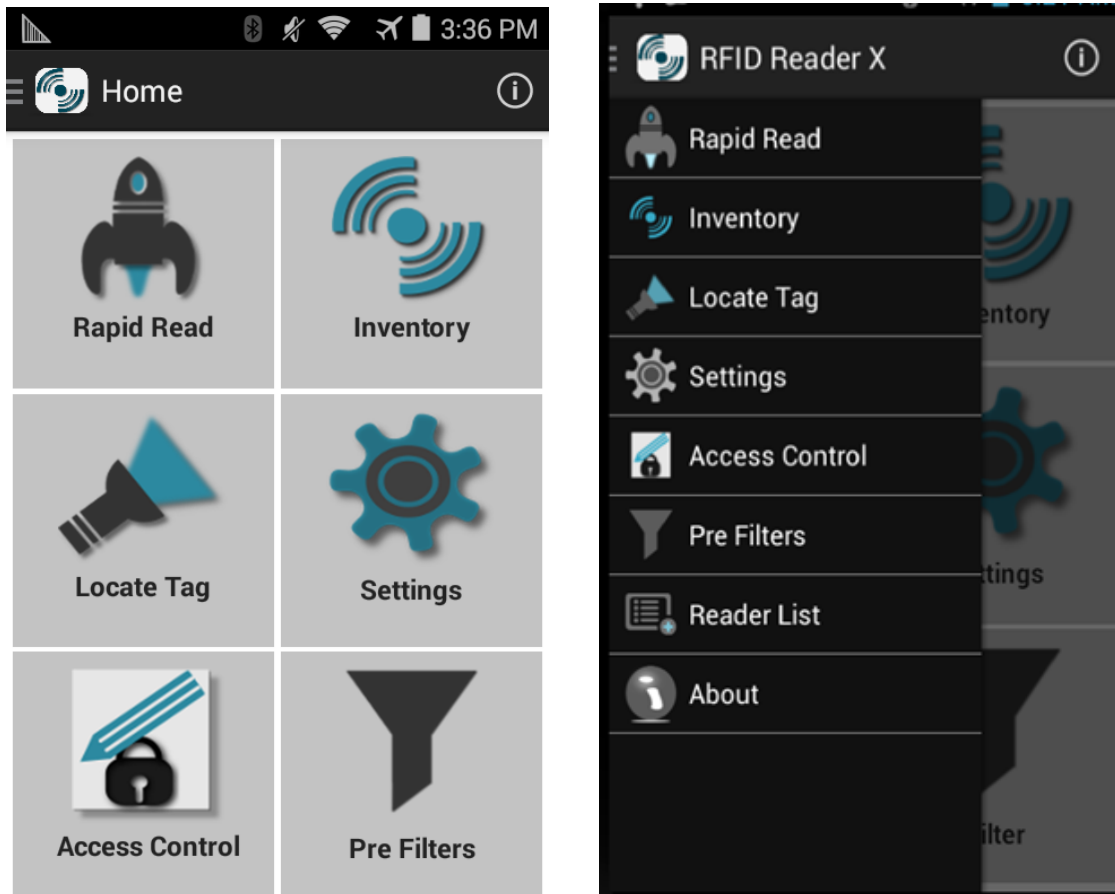
## Disconnecting

When the RFD8500i moves out of the TC55 NFC read field range, the application prompts the user to retain the Bluetooth connection, or not (see [Figure 3-4](#)).

## Demo Application Screens

### Home Screen

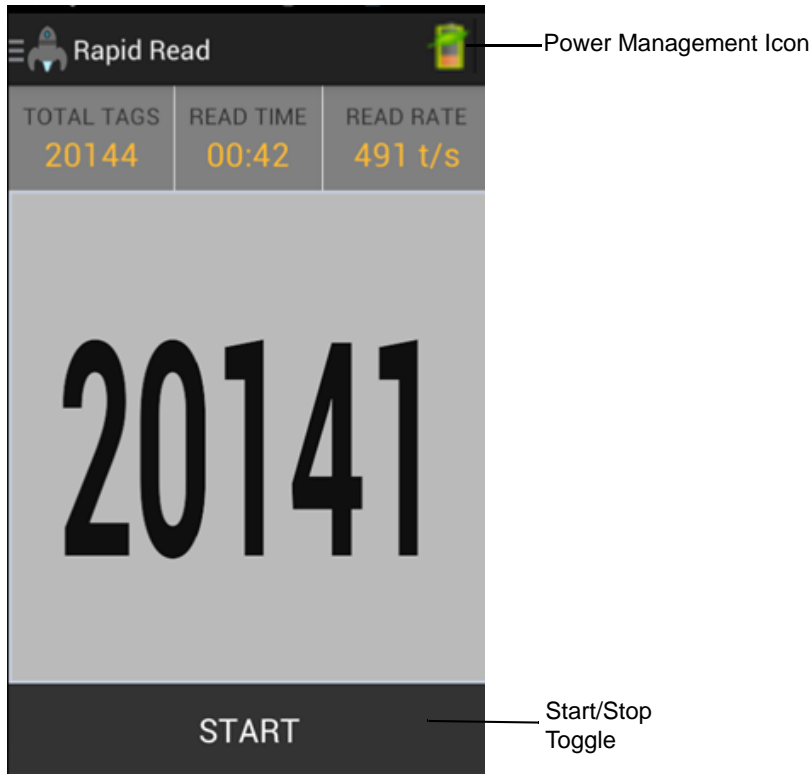
To access the *Zebra RFID Mobile Application for Android*, touch the *RFID Reader* icon (  ) on the mobile device to display the *Home* screen. Touch the *RFID Reader* icon again to display the *RFID Reader Menu*. Touch any menu item to access its screen.



**Figure 3-6** Home and Menu Screens

## Rapid Read

Touch *Rapid Read* from the *Home* or *Menu* screen.



**Figure 3-7** *Rapid Read* Screen

The *Rapid Read* and *Inventory* screens display the following data (see [Inventory](#) on page 3-9).

- Total tag count
- Read time (mm:ss)
- Tag read rate (tags/sec)
- Unique tag count (displays in the center of screen).

*Rapid Read* and *Inventory* screens are two different views of the inventory operation on the reader. The start/stop functionality can be used interchangeably on both screens. For example, when the user starts the operation on the *Rapid Read* screen and navigates to the *Inventory* screen, the button available on the *Inventory* screen is **STOP**. The same is true when the operation starts on the *Inventory* screen. During the rapid read process the user can navigate to the *Inventory* screen to view tag details along with tag counts for each tag. The statistics displayed are maintained on the *Rapid Read* and *Inventory* screens regardless of the screen used to start the process.

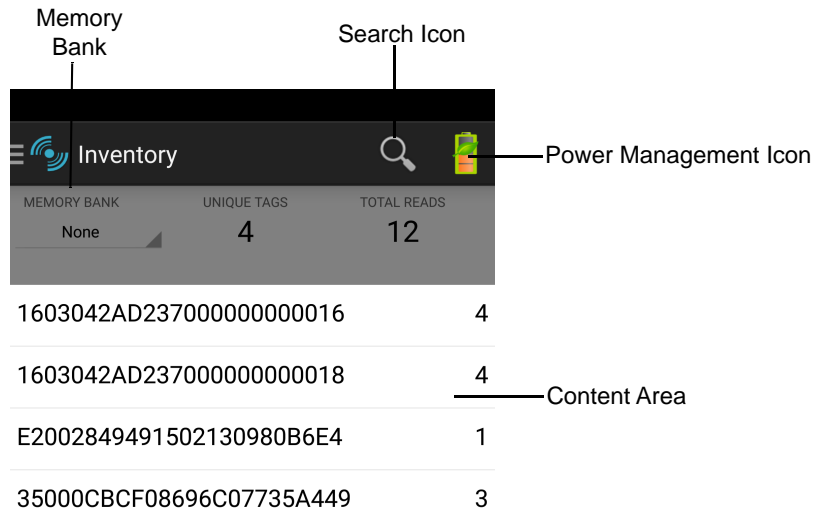
Touch **START** to start the rapid read inventory operation. Touch **STOP** to stop.

- ✓ **NOTE** The scan trigger on the RFD8500i can also start and stop the inventory operation. Press the trigger to start, and press again to stop.

Moving to another screen does not halt the operation. However, attempting to make changes or perform another operation while rapid read is in process results in an error.

## Inventory

Touch *Inventory* from the *Home* or *Menu* screen.



**Figure 3-8** *Inventory Screen*

Tag reading can be started and stopped on this screen as well as on the *Rapid Read* screen (see [Rapid Read on page 3-8](#)). When the process starts, tag information displays on the screen.

Touch **START** to start the rapid read inventory operation. The button changes to **STOP**. Touch it to stop the read inventory operation.

✓ **NOTE** The scan trigger on the RFD8500i can also start and stop the inventory operation. Press the trigger to start, and press again to stop.

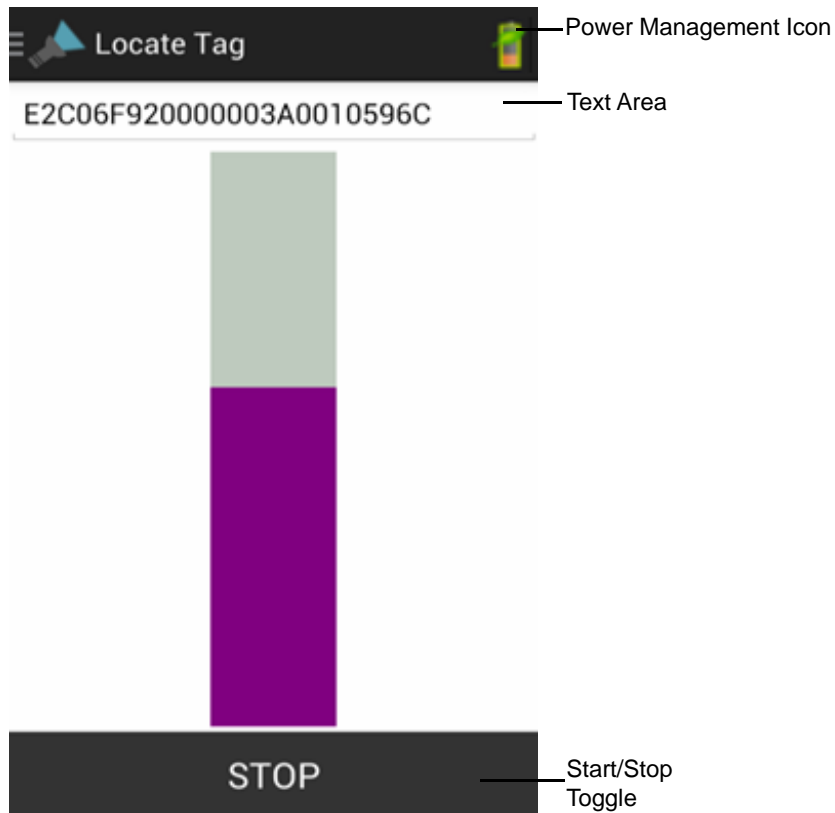
The tag ID selected displays on the *Locate Tag* screen when navigating to that screen (see [Locate Tag on page 3-11](#)).

**Inventory Screen Features****Table 3-1** Features on the Inventory Screen

Item	Description										
<b>Action Bar</b>											
Tags	<p>Touch the Memory Bank section and select one of the following memory bank options from the drop-down menu:</p> <ul style="list-style-type: none"> <li>• None - Defaults to EPC.</li> <li>• User - Allows reading user memory bank data when the tag is inventoried.</li> <li>• Reserved - Allows reading reserved memory bank data when the tag is inventoried.</li> <li>• TID - Allows reading TID memory bank data when the tag is inventoried.</li> <li>• EPC - Allows reading EPC memory bank data when the tag is inventoried.</li> </ul> <p>When the next inventory operation starts, the details from the selected memory bank displays. This menu is inactive if there is an ongoing operation on the connected reader.</p> <p>Default Display: None.</p>										
Search	Touch the <i>Search</i> icon and enter a tag ID. Tags that match the entry display in the content area.										
Power Management	Icon indicates if Dynamic Power is on. See <a href="#">Power Management on page 3-21</a> . Touch the <i>Power Management</i> icon to open the <i>Battery Status</i> screen.										
Content Area (select a tag)	Touching a Tag ID highlights the tag. The highlighted Tag ID is populated on the <i>Tag Location</i> text area as well as the <i>Tag Pattern</i> area in the <i>Access Control</i> screen. Touch <b>START</b> to start searching for the tag. See <a href="#">Locate Tag on page 3-11</a> for more details. From this scree return to the <i>Menu</i> or go to the <i>Home</i> screen and select <i>Locate Tag</i> .										
Content Area (select a tag)	<p>The tags displayed in this area are based on the option selected from the memory bank. Touch the tag ID to expand details about the tag. Touch the tag ID again to collapse details.</p> <p><b>Example Default Tag Display:</b></p> <table border="0" data-bbox="483 1360 1123 1432"> <thead> <tr> <th>Tag ID</th> <th>Tag Count</th> </tr> </thead> <tbody> <tr> <td>AD99 1540419072596540040</td> <td>4</td> </tr> </tbody> </table> <p><b>Example Expanded Tag Display:</b></p> <p><b>Note:</b> Expanded tag detail can only display when the inventory operation is stopped. Memory bank data is shown only when inventory is complete.</p> <table border="0" data-bbox="483 1549 1123 1650"> <thead> <tr> <th>Tag ID</th> <th>Tag Count</th> </tr> </thead> <tbody> <tr> <td>AD99 1540419072596540040</td> <td>4</td> </tr> <tr> <td>EPC MEMORY</td> <td>3000</td> </tr> </tbody> </table> <p>RSSI -50 Phase 1800 USER 1122334455667788AABBCCDDEEFF 1122334455667788AABBCCDDEEFF 1122334455667788AABBCCDDEEFF</p>	Tag ID	Tag Count	AD99 1540419072596540040	4	Tag ID	Tag Count	AD99 1540419072596540040	4	EPC MEMORY	3000
Tag ID	Tag Count										
AD99 1540419072596540040	4										
Tag ID	Tag Count										
AD99 1540419072596540040	4										
EPC MEMORY	3000										

## Locate Tag

Touch *Locate Tag* from the *Home* or *Menu* screen.



**Figure 3-9** *Locate Tag Screen*

On this screen, enter the *Tag ID* in the text area or select a tag from the *Inventory* screen to pre-populate the *Tag ID* to search.

Touch **START** to start the locate tag operation. Touch **STOP** to stop. The RFD8500i trigger can also be used to start and stop the operation.

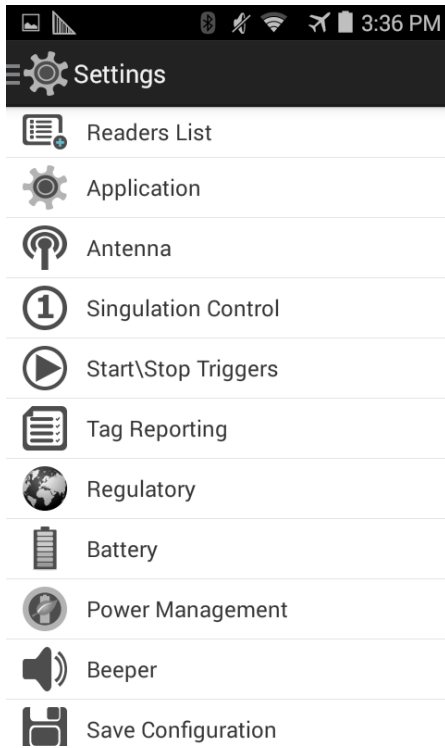
✓ **NOTE** The scan trigger on the RFD8500i can also start and stop the inventory operation. Press the trigger to start, and press again to stop.

The color bar on the display shows the relative distance of the tag.

When the locate tag operation starts, moving to another screen does not stop the operation until Stop is pressed.

## Settings

Touch *Settings* from the *Home* or *Menu* screen.



**Figure 3-10** *Settings Screen*

**Table 3-2** *Settings Screen Options*

Settings Option	Description	Page
Readers List	Displays all previous and new RFD8500i readers with which the mobile device paired.	<a href="#">3-13</a>
Application	Displays reader connection, notification, and data export settings.	<a href="#">3-14</a>
Antenna	Displays antenna power lever and link profile.	<a href="#">3-15</a>
Singulation Control	Displays <i>Session</i> , <i>Tag Population</i> , <i>Inventory State</i> and <i>SL Flag</i> .	<a href="#">3-16</a>
Start\Stop Triggers	Allows <b>START</b> and <b>STOP</b> button control.	<a href="#">3-17</a>
Tag Reporting	Support for reporting unique tags as part of Tag reporting options.	<a href="#">3-18</a>
Regulatory	Allows region and channel selections.	<a href="#">3-19</a>
Battery	Displays the RFD8500i battery status.	<a href="#">3-20</a>

**Table 3-2** *Settings Screen Options*

Settings Option	Description	Page
Power Management	Turns Dynamic Power Optimization on and off.	<a href="#">3-21</a>
Beeper	Use to turn the beeper on/off, and set volume.	<a href="#">3-22</a>
Save Configuration	Allows the user to save all settings: <i>Antenna, Singulation, Tag Reporting, START/STOP trigger, Beeper Volume, and Regulatory</i> . <b>Note:</b> The settings are also automatically saved when the user changes anything.	<a href="#">3-23</a>

**Readers List**

From the *Settings* screen, touch *Readers List*.

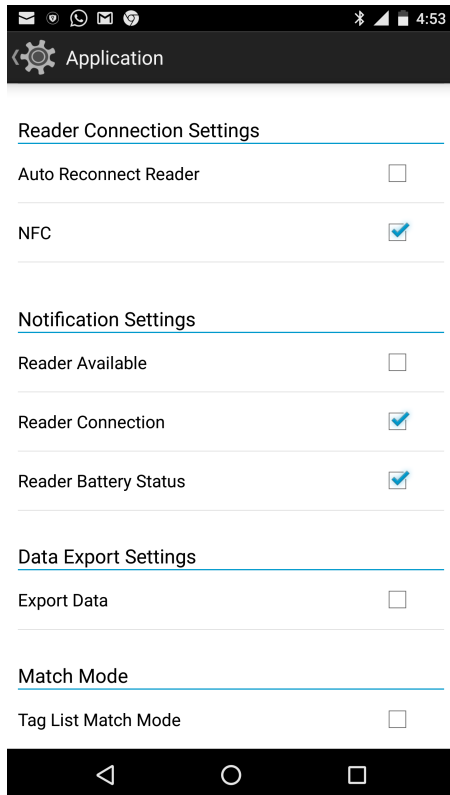
**Figure 3-11** *Settings - Readers List Screen*

This screen displays all available Bluetooth paired RFD8500i readers. The list includes the readers' serial and model numbers.

Touch a reader name from the list to establish a session with the selected reader; touch again to terminate the session. Touching a second reader in the list disconnects the currently connected reader and attempts to establish a connection to the newly selected reader.

## Application

From the *Settings* screen, touch *Application*.



**Figure 3-12** *Settings - Application Screen*

The application always detects readers that were paired over Bluetooth.

- **Auto Reconnect Reader:** When checked, the application does not attempt to reconnect to the reader if the connection is lost within the session.
- **NFC:** When checked, the application uses the NFC tag to connect to the reader via Bluetooth.
- By default the *Reader Battery Status* notification is enabled.
- **Export Data:** When checked, the application writes the inventoried RFID data to a file when the inventory operation stops. On Android platforms the file is saved in a fixed directory. The user can check files in file browsing in the *Inventory* directory (*Sdcard/inventory/<files>*), and these files can be copied to a PC.

## Tag List Match Mode

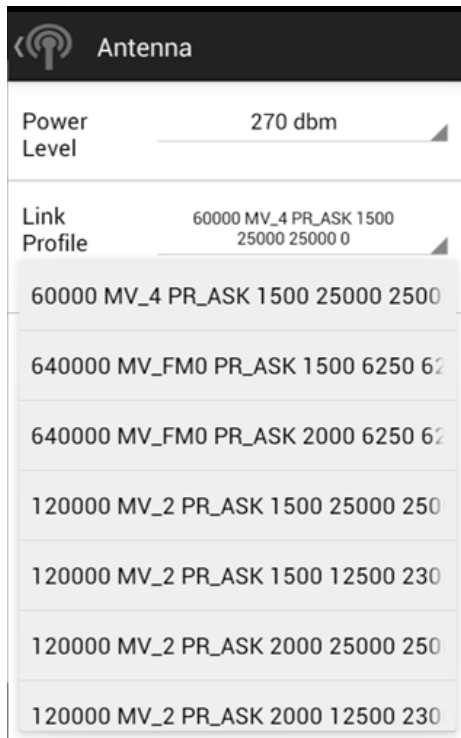
When checked this application groups the inventories tags as matching, missing, and unknown based on the set of tags present in the Taglist.csv file.

The Taglist.csv file should be placed at the root of the phone storage inside the rfid folder (in csv format).



**NOTES** 1. The folder name must be all lower case (i.e., rfid and not RFID).

2. For more information about Tag List Match Mode, refer to the RFD8500 User Guide p/n/ MN002065AXX.

**Antenna****Figure 3-13** Settings - Antenna

This screen displays:

- *Power Level* displays the current selection and includes a drop-down list of available power levels (as reported by RFD8500i). 27.0 dBm is the default setting, and it is shown as 270 because the value used is in units of tens of dBm. Japan units are set to a different default power level depending on the SKU type.

The minimum power level when DPO is enabled (dynamic power optimization) is 3.1 dBm. When DPO is disabled, the minimum power level is 0 dBm.

- *Link Profile* displays the current selection and includes a drop-down list of available link profiles (reported by RFD8500i).

Link Profile display format is as follows: Return link bit data rate in bis per second (e.g., 60000 -> 60 Kbs); Miller Value (e.g., MV\_4 -> Miller 4); modulation type (PR ASK is the only one supported); PIE value has no units and is either 1.5 or 2 (e.g., 1.5 -> 1500 and 2 -> 2000); minimum Tari value in thousands of micro seconds (e.g., 6250 -> 6.25 microseconds); maximum Tari value in thousands of micro seconds; Tari step value in thousands of micro seconds. If the step value is zero, then Tari is fixed for this link profile. If the step size is non zero, then the default Tari value is the minimum value.

The *Power Level* and *Link Profile* are blank when there is no connection to the reader.

**Singulation Control**

The screenshot shows the 'Singulation Control' settings screen. At the top, there is a dark header with a back arrow and a circled '1'. Below the header, there are four settings, each with a label and a drop-down menu:

- Session:** S0
- Tag Population:** 30
- Inventory State:** STATE A
- SL Flag:** ALL

The 'SL Flag' drop-down menu is open, showing three options: ALL, DEASSERTED, and ASSERTED.

**Figure 3-14** Settings - Singulation Control

Use this screen to view/configure the singulation control settings for each antenna.

- *Session* options. The drop-down list includes the available options (S0, S1, S2, S3).
- *Tag Population*. A numeric value of the estimated number of tags in the Field of View (FOV). Values shown are 30,100,200,300,400,500,600.
- *Inventory State* options. State A & State B, AB FLIP
- SL flag options: ALL, DEASSERTED, ASSERTED

All values can be selected from the drop-down lists.

**Start/Stop Triggers**

The screenshot shows the 'Start Stop Triggers' settings interface. It has a dark header with a back arrow and the title 'Start Stop Triggers'. Below the header, there are two main sections: 'Start' and 'STOP', each separated by a horizontal line. In the 'Start' section, 'Start Trigger' is a dropdown menu currently showing 'Handheld'. Below it are two checkboxes: 'Trigger Released' (unchecked) and 'Trigger Pressed' (checked). In the 'STOP' section, 'Stop Trigger' is a dropdown menu currently showing 'Duration'. Below it is a text input field labeled 'Duration'.

**Figure 3-15** Settings - Start/Stop Triggers

The Start Trigger *Periodic* displays the *Period* input box allowing the user to enter the period in milliseconds.

The Stop Trigger *Duration*, *Tag Observation* and *N attempts* displays numeric value input boxes. All time entries are in milliseconds.

If the user does not enter all the required details for saving triggers to the reader, the application does not save the trigger settings to the reader.

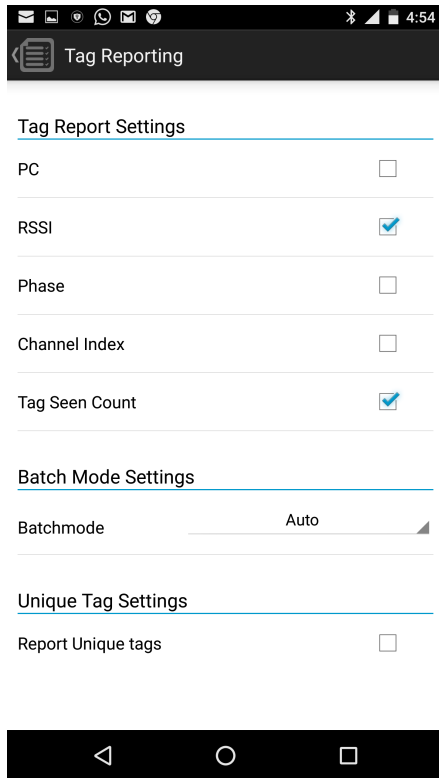
Required input for *Start/Stop Trigger* settings:

- Start Trigger
  - Immediate.
  - Hand-held - User should select either the *Trigger Pressed* or *Trigger Released* check box.
  - Periodic - User should enter the period of time in milliseconds.
- Stop Trigger
  - Immediate.
  - Hand-held - User should select either the *Trigger Pressed* or *Trigger Released* check box along with *Timeout* in milliseconds.
  - Duration - User should enter duration in milliseconds.
  - Tag Observation - User should enter the tag count along with timeout in milliseconds.
  - N Attempts - User should enter the number of attempts along with timeout in milliseconds.

If the start trigger type is HH trigger (pressed or released) or Periodic, the application sets the repeat for the operation to ensure the use case if repeated operations can be demonstrated.

## Tag Reporting

These selections drive what the user sees on the *Inventory* screen.



**Figure 3-16** Settings - Tag Reporting

**Table 3-3** Tag Reporting Screen Options

Option	Description
PC	Select to allow reporting the PC as part of the Tag Data.
RSSI	Selection indicates whether or not the RSSI (Received Signal Strength Indication) is reported as part of the Tag Data.
Phase	Select to indicate whether or not the Phase is reported as part of the Tag Data.
Channel Index	Select to indicate whether or not the Regulatory Channel Index is reported as part of the Tag Data.

**Table 3-3** Tag Reporting Screen Options (Continued)

Option	Description
Tag Seen Count	Select to indicate whether or not the Tag Seen Count is reported as part of the Tag Data.
Batch Mode Settings	Batch mode settings can be configured for one of the following: <ul style="list-style-type: none"> <li>• Disable -Tags are reported in real time as they are inventoried. No data is preserved if the application disconnects.</li> <li>• Enable - Tags are not reported in real time. The inventory must be stopped, and the getTags command must be issued to get the Tag Data.</li> <li>• Auto - Tags are reported in real time as the long as the application that started the inventory is still connected. On application disconnect the Tag Data is stored on the reader, and the application can connect and get the tags using the getTags command.</li> </ul>
Report Unique Tags	When checked this option configures the reader to report unique tags. In this mode once a tag is reported it is not reported back unless the tags are purged from the reader.

**Regulatory**

**Regulatory**

Region

ARG

Channel Selection

- 915750
- 915250
- 903250
- 926750
- 926250
- 904250

**Warning:**  
Select only the country in which you are using the device

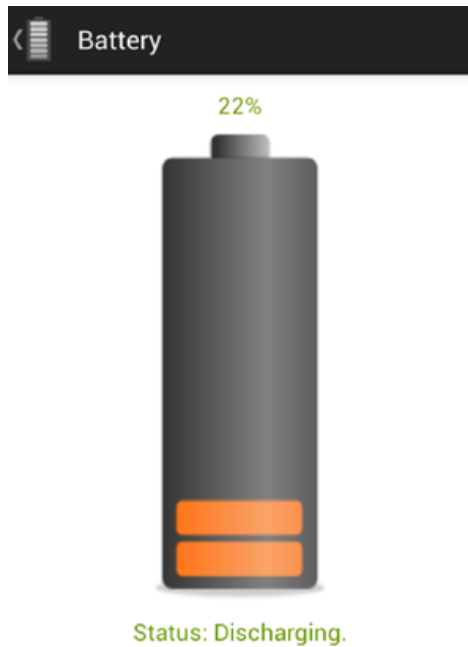
**Figure 3-17** Settings - Regulatory

The region drop-down displays the current region to which the device is set. Choose the correct region before using the device.

- Channel selection is allowed only for the regions that allow channel setting.
- Supported regions are reported by the RFD8500i.

- If the region is not configured on the RFD8500i the *Regulatory* screen is the first screen displayed after connecting to the RFD8500i.

### **Battery**

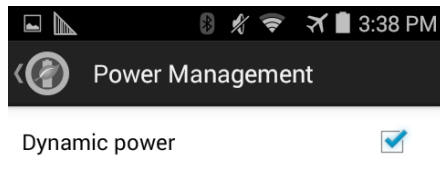


**Figure 3-18** *Settings - Battery*

This screen displays the status of the battery in the RFD8500i.

- Level is 100% (in green): *Status: Battery is fully charged.*
- Charging (in green): *Status: Charging.*
- Discharging (in green): *Status: Discharging.*
- Critical (in red): *Status: Battery Level is Critical.*
- Low (in red): *Status: Battery Level Low.*
- Reader is not connected (in grey): *No Active Connection.*

## ***Power Management***



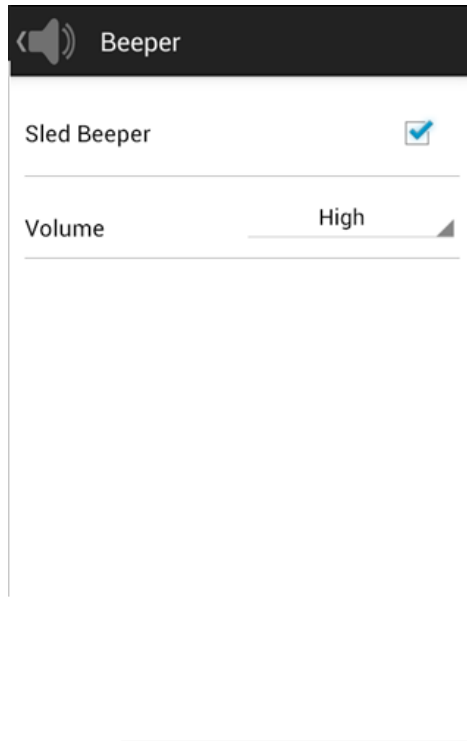
Dynamic Power optimization configures the reader for best battery life and works with Pre configured settings. Dynamic Power optimization works only for inventory operation

**Figure 3-19** *Settings - Power Management*

This screen provides an option to enable Dynamic Power Optimization (DPO) in the reader. Enabling DPO enhances battery life when performing inventory operations.

✓ **NOTE** DPO is enabled by default. With DPO enabled, access operations and filters/singulation setting changes do not take effect.

If Dynamic Power is on, a green battery icon appears in the title bar of the application. Clicking on this opens the *Battery Status* screen.

**Beeper**

**Figure 3-20** Settings - Beeper

This screen displays the current beeper settings. The user can turn the beeper off (by unchecking the *Sled Beeper* check box), or set the volume to *High*, *Medium* or *Low*.

**Save Configuration**

ANTENNA	
Antenna Power	270 dbm
Link Profile	60000 MV_4 PR_ASK 1500 25000 25000 0
SINGULATION	
Session	S0
Tag Population	30
Inventory State	STATE B
SL Flag	DEASSERTED
TAG REPORT	
SAVE	

START \ STOP TRIGGERS	
Tag Seen Count	OFF
Start Trigger	Immediate
Stop Trigger	Immediate
BEEPER	
Sled Beeper	ON
Beeper volume	High
REGULATORY	
Region	ARG
SAVE	

**Figure 3-21** Settings - Save Configuration

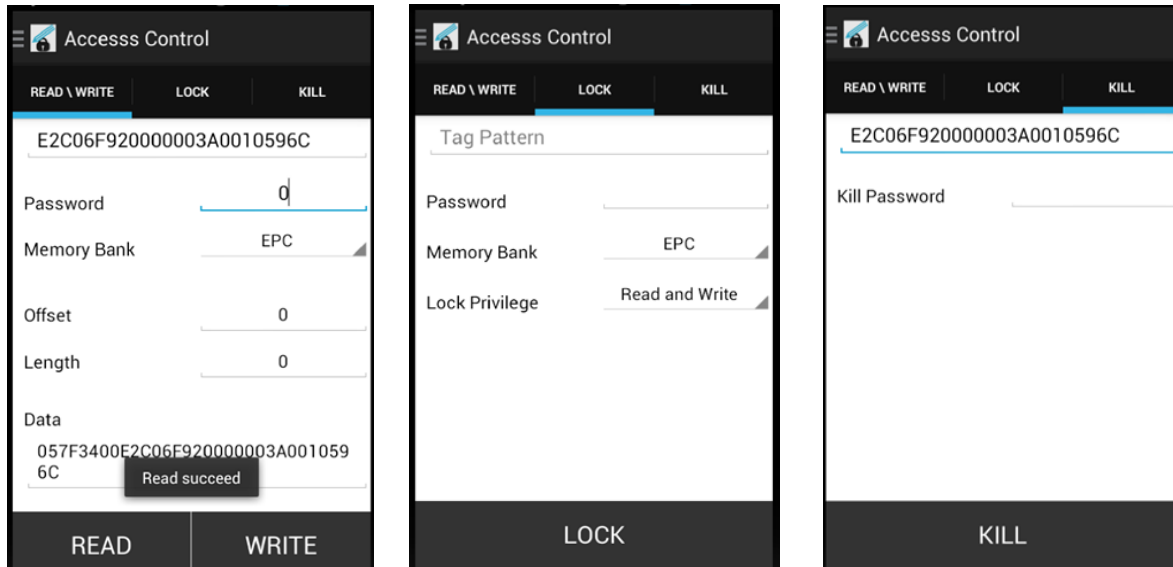
This screen can be used to save the settings and get a snapshot of current settings on the RFD8500i.

The settings persist on RFD8500i until the user performs a hard reset of the unit.

The Tag Pattern area is automatically filled in when a tag is selected/highlighted in the *Inventory* screen.

## Access Control

- ✓ **NOTE** DPO must be disabled from the *Power Management* screen to allow access operation functionality.



**Figure 3-22** Access Control Screens - Read/Write; Lock; Kill

### Read/Write

- Tag ID & Password values are in hex. Tag ID is edited.
- Memory Bank options: EPC, RESERVED, TID and USER.
- Offset and Length values are in 16-bit words.
- Access operation screen maintains edited tag ID.

### Lock

Lock privilege options:

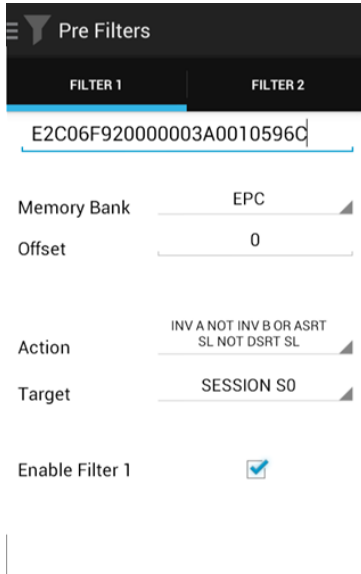
- Read and Write
- Permanent Lock
- Permanent Unlock
- Unlock.

### Kill

Permanently renders the tag unusable. A kill password must be provided.

## Pre Filters

✓ **NOTE** DPO must be disabled from the *Power Management* screen to allow Pre Filter functionality.



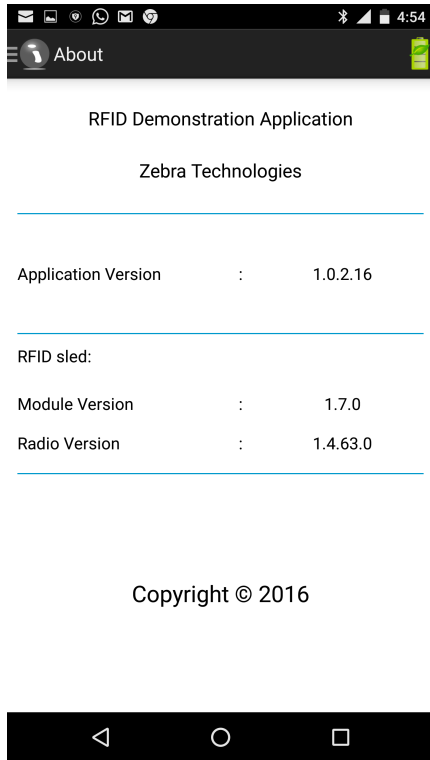
**Figure 3-23** *Pre Filters Screen*

### Options

- *Memory Bank:* EPC, TID and USER.
- *Offset:* Offset in the memory bank is specified in words.
- *Action:*
  - INV A NOT INV B or ASRT\_SL\_NOT\_DSRT\_SL
  - INV A or ASRT SL
  - NOT INV B or NOT DSRT SL
  - INV A2BB2A NOT INV A or NEG SL NOT ASRT SL
  - INV B NOT INV A or DSRT SL NOT ASRT SL
  - INV B or DSRT SL
  - NOT INV A or NOT ASRT SL
  - NOT INV A2BB2A or NOT NEG SL
- *Target:* SESSION S0, SESSION S1, SESSION S2, SESSION S3 & SL FLAG.

Up to two *Pre Filters* can be enabled.

## About



**Figure 3-24** *About Screen*

This screen displays version information as reported by the RFD8500i.

# Chapter 4 123SCAN

---

## Introduction

123Scan is an easy-to-use, PC-based software tool that enables the quick and easy setup of Zebra scanners, and the RFD8500i reader.

123Scan uses a wizard tool to guide users through a streamlined set up process. Once parameters are set, the values are saved to a configuration file that can be distributed via e-mail, electronically downloaded via a USB cable. 123Scan can generate multiple reports that can be easily re-branded using Microsoft Word or Access. Report options include programmed parameters, and asset tracking information.

Additionally, 123Scan can upgrade RFD8500i firmware, automatically check online to enable support for newly released products, and stage scanners simultaneously via USB hub(s).

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## Communication with 123Scan

To communicate with the 123Scan program which runs on a host computer running a Windows XP SP2, Windows 7, and Windows 8 operating system, use a USB cable to connect the device to the host computer.

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## 123Scan Requirements

- Host computer with Windows.
- USB cable.
- RFD8500i.
- Plug-ins:
  - Configuring RFD8500i requires only the RFD8500i plug-in.

For more information on 123Scan, go to: <http://www.zebra.com/123scan>.

For a 1 minute tour of 123Scan, go to: <http://www.zebra.com/ScannerHowToVideos>.

To download 123Scan software and access the Help file integrated in the utility, go to: [www.zebra.com/scannersoftware](http://www.zebra.com/scannersoftware).



# Appendix A TROUBLESHOOTING, TECHNICAL SPECIFICATIONS and MAINTENANCE

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## Introduction

This chapter includes instructions on cleaning and maintenance, troubleshooting solutions for potential problems, and the web address for technical specifications.

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## Troubleshooting

✓ **NOTE** Always ensure the battery cover and battery are properly installed.

**Table A-1** *Troubleshooting*

Problem	Possible Causes	Possible Solutions
Amber power LED turns on, or red power LED blinks.	Battery is low.	Charge the battery. See <a href="#">Charging the Battery in the Reader on page 1-8</a> .
Reader does not fully charge.	Attempt to charge on a non-powered USB hub.	Connect the reader to a powered USB power adapter (5V, 1.2A max).
Bluetooth LED turns off.	Reader is out of range of the Bluetooth host.	Move closer to the host and press any key to re-pair with the host.
Unable to pair the RFD8500i with the mobile device.	Bluetooth is off on the mobile device.	Turn on Bluetooth on the mobile device.
	Bluetooth on the RFD8500i is off.	Turn on Bluetooth on the RFD8500i.
	NFC on the TC55 is off.	Enable NFC on the TC55.

**Table A-1** Troubleshooting (Continued)

Problem	Possible Causes	Possible Solutions
Unable to discover the RFD8500i.	RFD8500i is turned off.	Turn on the RFD8500i.
	RFD8500i is not in discover mode.	Press the <b>Bluetooth</b> button for 1 second to put the RFD8500i into discover mode.
No RFID data displays in the application on the mobile computer when the RFD8500i starts reading.	Batch mode is enabled.	In the Batch mode setting, set RFD8500i to <i>Auto</i> or <i>Disable</i> from the Tag Reporting screen.
Device does not boot up.		Press the <b>Function</b> and <b>Power</b> buttons simultaneously to halt the boot process and recover devices with an improper firmware image (i.e, devices that cannot boot up). Press <b>Function</b> and <b>Bluetooth</b> buttons simultaneously for three seconds to perform a soft reset.

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## Technical Specifications

For the latest technical specification information for the RFD8500i, visit: <http://www.zebra.com/RFD8500i>.

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## Cleaning



**CAUTION** Always wear eye protection.

Read warning label on compressed air and alcohol product before using.

If you have to use any other solution for medical reasons please contact Motorola for more information.



**WARNING!** Avoid exposing this product to contact with hot oil or other flammable liquids. If such exposure occurs, unplug the device and clean the product immediately in accordance with these guidelines.

## Approved Cleanser Active Ingredients

100% of the active ingredients in any cleaner must consist of one or some combination of the following: isopropyl alcohol, bleach/sodium hypochlorite, hydrogen peroxide or mild dish soap.

## Harmful Ingredients

The following chemicals are known to damage the plastics on the RFD8500i and mobile computers and should not come in contact with the device: ammonia solutions, compounds of amines or

ammonia; acetone; ketones; ethers; aromatic and chlorinated hydrocarbons; aqueous or alcoholic alkaline solutions; ethanolamine; toluene; trichloroethylene; benzene; carbolic acid and TB-lysoform.

## Cleaning Instructions

Do not apply liquid directly to the RFD8500i and mobile computers. Dampen a soft cloth or use pre-moistened wipes. Do not wrap the device in the cloth or wipe, but gently wipe the unit. Be careful not to let liquid pool around the display window or other places. Allow the unit to air dry before use.



**IMPORTANT** Do not clean the device or expose it to rain or moisture when the battery cover is removed. Without the battery cover, the device is not water/dust sealed.

## Special Cleaning Notes

Many vinyl gloves contain phthalate additives, which are often not recommended for medical use and are known to be harmful to the housing of the RFD8500i and mobile computers. The RFD8500i should not be handled while wearing vinyl gloves containing phthalates, or before hands are washed to remove contaminant residue after gloves are removed. If products containing any of the harmful ingredients listed above are used prior to handling the RFD8500i, such as hand sanitizer that contain ethanalamine, hands must be completely dry before handling the RFD8500i to prevent damage to the plastics.

## Materials Required

- Alcohol wipes
- Lens tissue
- Cotton tipped applicators
- Isopropyl alcohol
- Can of compressed air with a tube.

## Cleaning Charge Connectors

To clean the connectors on a cradle:

1. Remove the DC power cable from the cradle.
2. Dip the cotton portion of the cotton tipped applicator in isopropyl alcohol.
3. Rub the cotton portion of the cotton tipped applicator along the pins of the connector. Slowly move the applicator back-and-forth from one side of the connector to the other. Do not let any cotton residue on the connector.
4. All sides of the connector should also be rubbed with the cotton tipped applicator.
5. Spray compressed air in the connector area by pointing the tube/nozzle about ½ inch away from the surface.



**CAUTION** Do not point nozzle at yourself and others, ensure the nozzle or tube is pointed away from your face.

6. Ensure that there is no lint left by the cotton tipped applicator, remove lint if found.
7. If grease and other dirt can be found on other areas of the cradle, use lint free cloth and alcohol to remove.
8. Allow at least 10 to 30 minutes (depending on ambient temperature and humidity) for the alcohol to air dry before applying power to cradle.

If the temperature is low and humidity is high, longer drying time is required. Warm temperature and dry humidity requires less drying time.

## Cleaning Frequency

The cleaning frequency is up to the customer's discretion due to the varied environments in which the mobile devices are used. They may be cleaned as frequently as required.

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## Maintenance

For trouble-free service, observe the tips that follow when using the device.

### RFD8500i

- Although the device is water and dust resistant, do not expose it to rain or moisture for an extended period of time. In general, treat the device as a pocket calculator or other small electronic instrument.
- Do not clean the device or expose it to rain or moisture when the battery is removed. Without the battery, the device is not water/dust sealed.
- Do not drop the device or subject it to strong impact.
- Protect the device from temperature extremes. Do not leave it on the dashboard of a car on a hot day, and keep it away from heat sources.
- Do not store or use the device in any location that is extremely dusty, damp, or wet.
- Do not use window cleaning solution. Use a soft cloth dampened with a 50/50 solution of isopropyl alcohol and water. See [Cleaning on page A-2](#).
- Do not allow the solution to form a pool of liquid anywhere on the screen or device.
- Do not use a large amount of solution to cause the device to remain wet.

### Battery



**WARNING!** Do not store the device with the battery installed. Doing so long term may cause irreversible harm to the battery. Always store the battery removed from the device. If a battery is installed during long term storage, it may discharge to point at which it cannot be recovered.

Even when stored separately from device it is important to follow industry standard guidelines. When batteries are stored over a year, battery cell manufacturers advise that some irreversible deterioration in overall battery quality may occur. To minimize this loss, they recommend storing batteries half charged in a dry, cool place between 41° and 77°F (5° and 25°C), the cooler the better. Batteries should be charged to half capacity at least once a year. In order to charge a battery to half capacity, take a fully discharged battery and charge it for two hours. If an electrolyte leakage is observed, avoid any contact with the affected area and properly dispose of the battery.

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