

RFD90 Ultra- Rugged UHF RFID Sled



ZEBRA

Product Reference Guide

2025/05/19

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About this Document

This document provides information on using the RFD9030 Ultra-Rugged Standard-Range UHF RFID sled and the RFD9090 Long-Range Ultra-Rugged UHF RFID sled.

Notational Conventions

The following conventions are used in this document:

Bold text is used to highlight the following:

- Dialog box, window, and screen names.
- Drop-down list and list box names.
- Checkbox and radio button names.
- Checkbox and radio button names.
- Icons on a screen.
- Key names on a keypad.
- Button names on a screen.

Bullets (•) indicate:

- Action items.
- List of alternatives.
- Lists of required steps that are not necessarily sequential.

Sequential lists (for example, those that describe step-by-step procedures) appear as numbered lists.

Service Information

If you have a problem with your equipment, contact Zebra Global Customer Support for your region. Contact information is available at: zebra.com/support.

When contacting support, please have the following information available:

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

Zebra responds to calls by email, telephone, or fax within the time limits outlined in support agreements.

If your problem cannot be solved by Zebra Customer 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 void the warranty.

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

Getting Started

The RFD90 Ultra-Rugged UHF RFID sled provides RAIN Radio Frequency Identification (RFID) tag reading, writing, and locating capability to support Zebra mobile computers and other host devices. This section provides information on sled features, adaptor installation, mobile computer attachment, battery replacement, UI indications, and charging.

To use the RFD90 sled for the first time with a mobile computer:

1. Insert the battery into the device.
2. Charge the RFD90 sled using the charging cradle or charging cup.
3. Replace the cover with the adaptor that is specific to the mobile computer to be used with the sled.
4. Place the mobile computer into the adaptor bottom first.
5. Secure the mobile computer into the adaptor by pressing down on the center of the top of the mobile computer.
6. Set the region using 123RFID Desktop or 123RFID Mobile applications. For more information visit zebra.com/123RFID.

For the latest versions of guides and software, go to: zebra.com/support.

For detailed information, refer to the Product Reference Guide at: zebra.com/support.

For a detailed configuration of the sleds, refer to the [123RFID Desktop User Guide](#).

Unpacking

This section provides information on Zebra RFD90 Ultra-Rugged UHF RFID Sled sled parts, battery installation, mobile device attachment, LED indications, and charging. Carefully remove all protective material from the RFD90 Ultra-Rugged sled and save the shipping container for later storage and shipping.

Verify the following items are in the box:

- RFD90 Ultra-Rugged UHF RFID Sled
- Battery
- Quick Start Guide

Inspect the equipment for damage. If any equipment is missing or damaged, contact the Zebra Support Center immediately.

For a full list of accessories that can be used with the RFD90 Ultra-Rugged UHF RFID sled, refer to the product-specific Technical Accessory Guide available at: zebra.com/support.

Adaptor Installation

To install an adaptor:

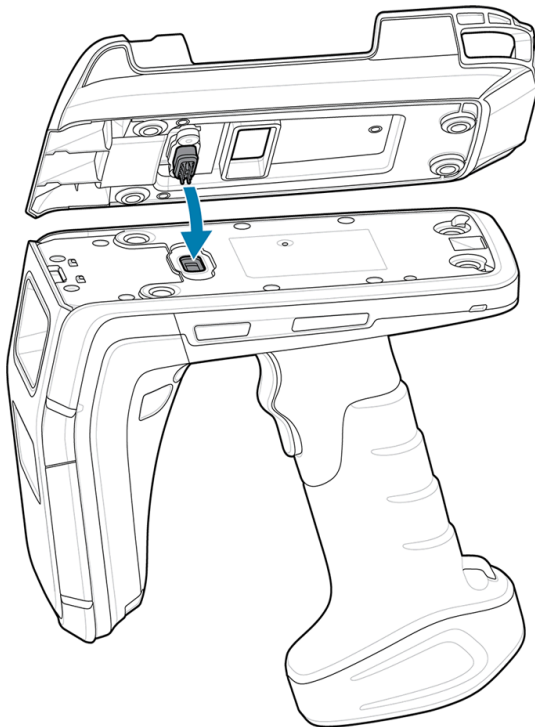
1. Remove the cover by pulling up on the lip.



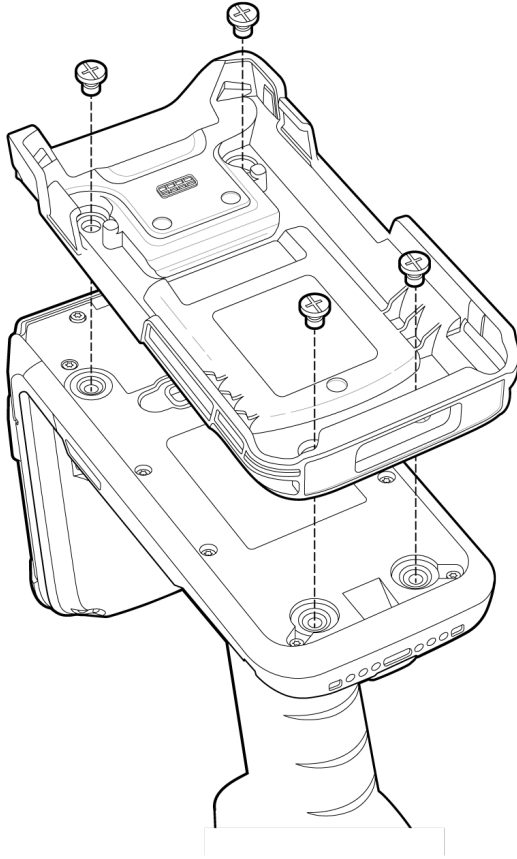
2. Ensure that the pogo pins are aligned and insert the adaptor into the sled.



NOTE: When installing the adaptor, use caution and ensure that the pogo pins are lined up directly prior to insertion



3. Secure the adaptor onto the RFD90 by fastening the four screws into the sled. Recommended Torque: 2.5 kgf-cm (14 ibf/in.).



RFD9030 Standard-Range Ultra-Rugged UHF RFID Sled Features

Figure 1 RFD9030 Standard-Range Ultra-Rugged UHF RFID Features

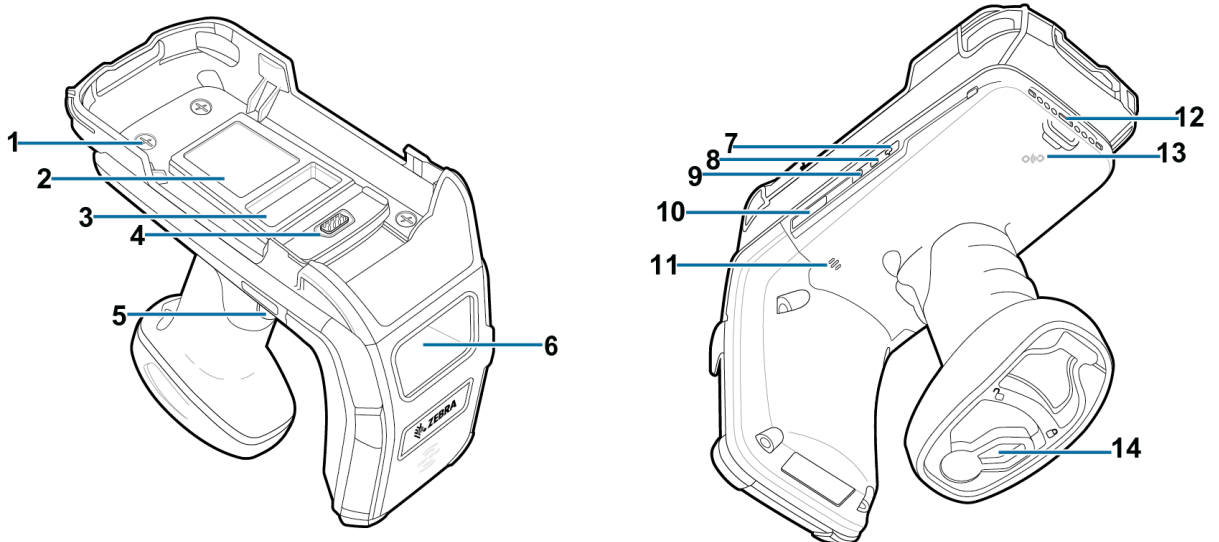


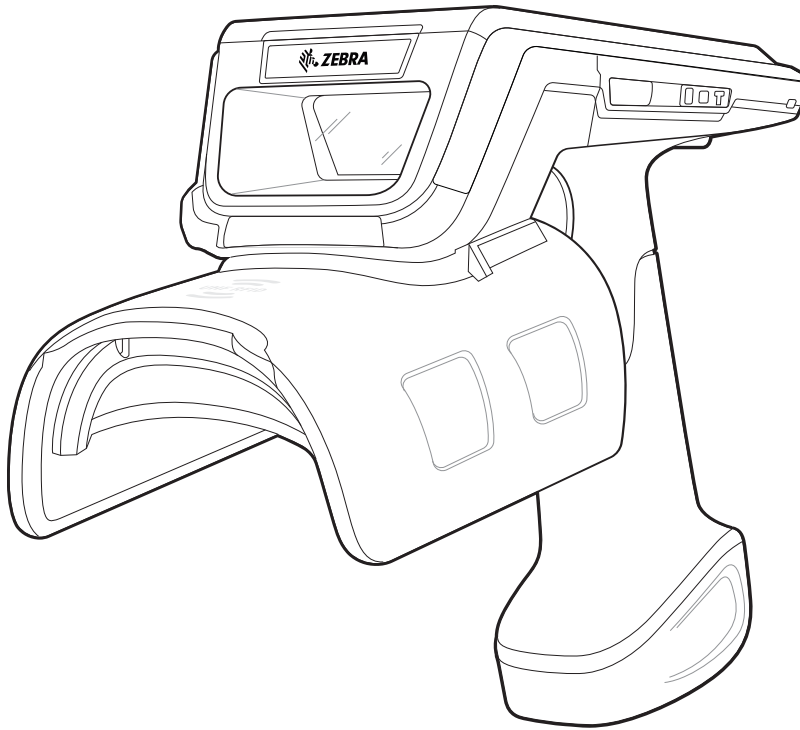
Table 1 RFD9030 Standard-Range Ultra-Rugged UHF RFID Sled Features

Item	Description
1	Screws (4)
2	Adaptor Label
3	Sled Label
4	eConnex Communication Port (available on eConnex-enabled adaptors only)
5	Tri-Function Trigger
6	Imager
7	Wi-Fi Status LED
8	Battery Status LED
9	Bluetooth LED
10	Status LED
11	Beeper
12	Charging Contacts
13	NFC Area
14	Battery Door Lock

RFD9090 Long-Range Ultra-Rugged UHF RFID Sled

The RFD9090 RFID Long Range Ultra-Rugged UHF RFID sled has the capacity to decode symbologies from an extended distance.

Figure 2 RFD9090 Long Range Ultra-Rugged UHF RFID Sled



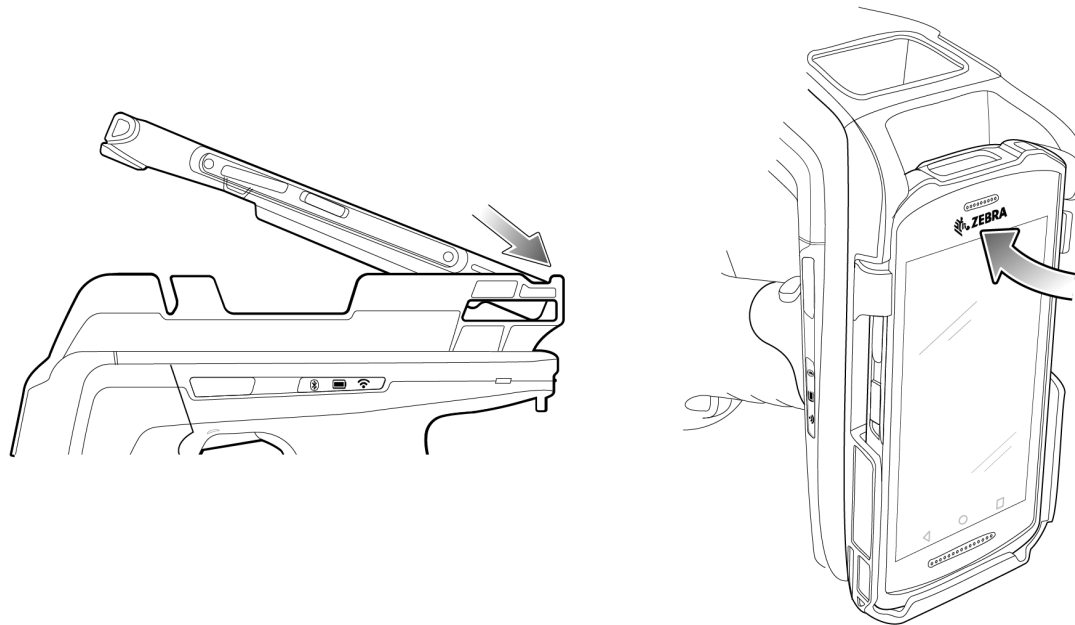
Device Installation

To secure the mobile computer to the RFD90 sled, place the bottom of the device fully forward into the RFD90 sled adaptor and push on the top center of the mobile computer to secure it.



NOTE: While installing the mobile computer into the adaptor, use caution and do not collide with the pogo pins on the RFD90.

Figure 3 Device Installation



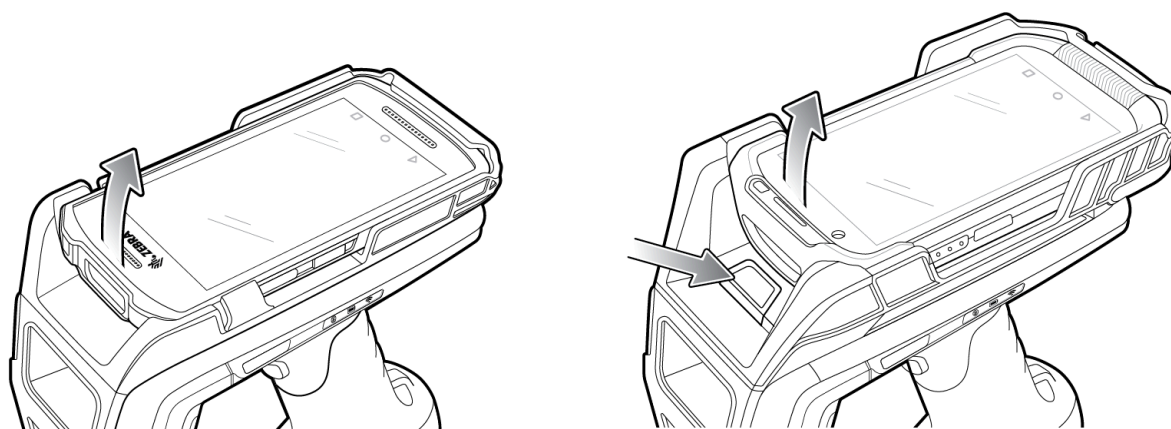
Device Removal

To remove the mobile computer from the sled, firmly hold the sled handle, and lift the device off the sled adaptor.



NOTE: If using a TC7 mobile computer (shown on the right in the figure below) with the RFD90 sled, press the button on the adaptor to release the mobile computer and lift the device off of the sled adaptor.

Figure 4 Device Removal

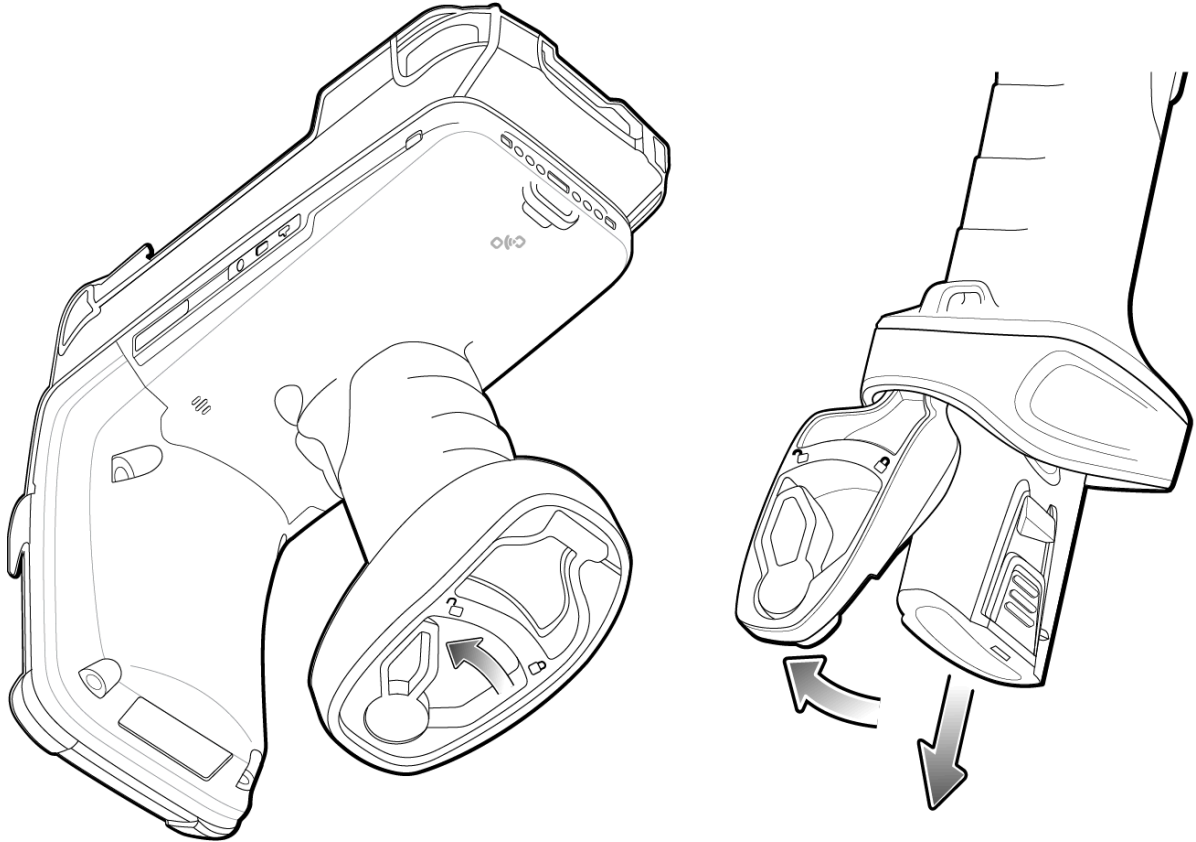


Battery Replacement

The battery that comes standard with the sled can be replaced by following the instructions outlined in this section.

To remove the battery from the sled:

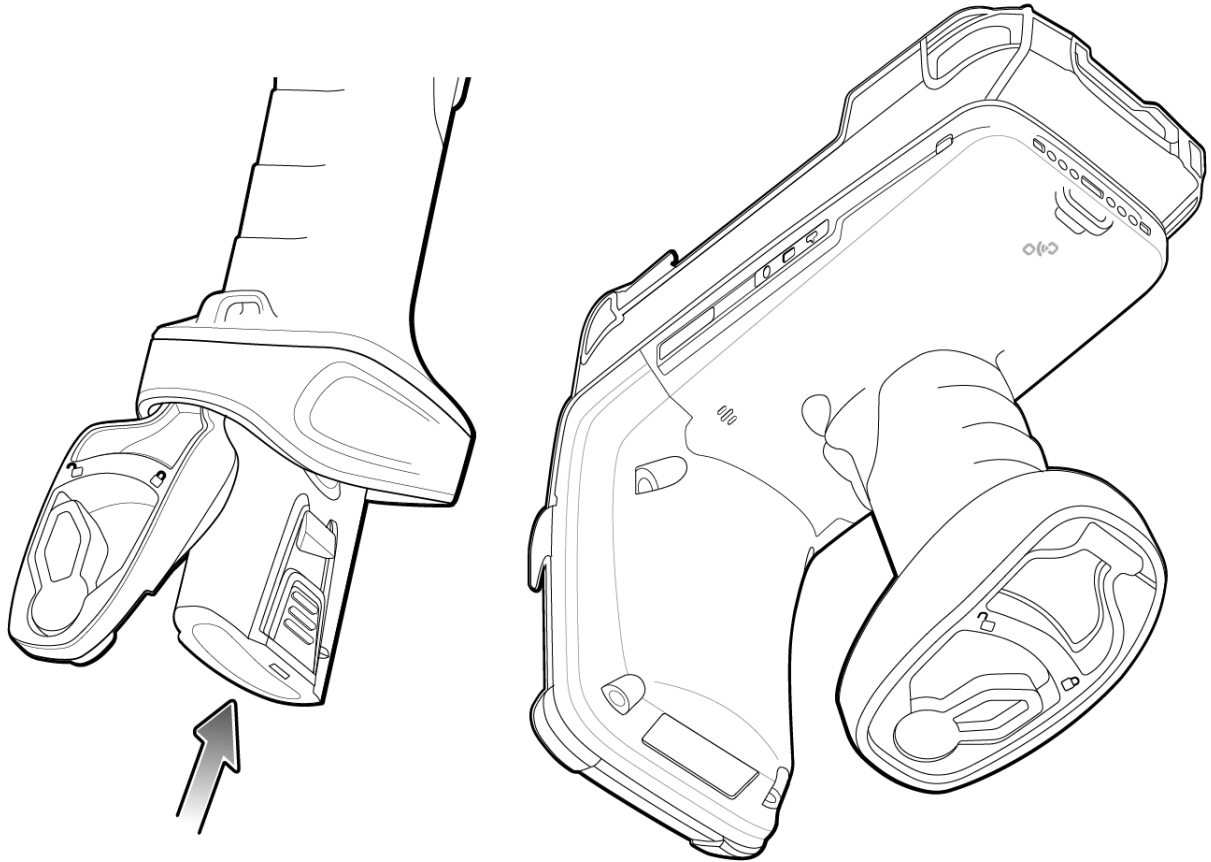
Figure 5 Battery Removal



1. Slide the locking latch to the left to unlock the battery door.
2. Open the battery door.
3. Pull the battery downward to remove it.

Battery Installation

Open the battery locking door and slide the battery into the handle to install the battery into the sled. Slide the lock on the battery locking door into the locked position to lock the door and secure the battery.



Pairing the Sled with a Mobile Computer

Pair the sled with a mobile computer by connecting directly with the communication port, scanning the 2D barcode on the device, or using the Tap-to-Pair feature on the RFD90 to activate NFC Bluetooth pairing and facilitate Bluetooth communication between the sled and the mobile computer.

- To connect via scan, tap the **Scan** tab and scan the code on the sled using the mobile computer to obtain the Bluetooth MAC address and pair the device to the sled.

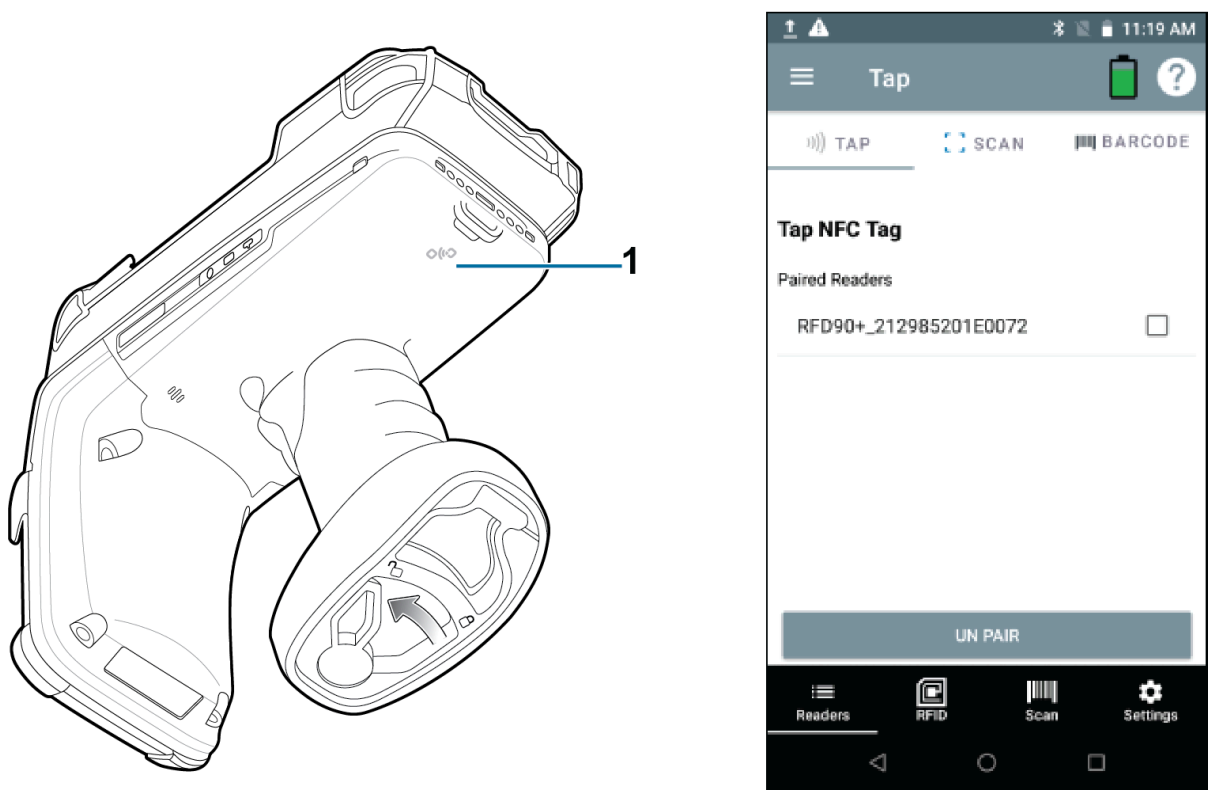
Figure 6 Scan 2D Barcode to Obtain MAC Address



1	2D Barcode on Bluetooth Connection Manufacturing Label
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- To connect via NFC, tap the **Tap** tab and align the NFC area behind the sled handle with the NFC area on the back of the mobile computer to pair.

Figure 7 Tap-to-Pair



1	NFC Area
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When the mobile computer has paired with the sled, it recognizes the device and automatically connects using 123RFID Mobile.

Charging using a Cradle

Before using the RFD90 RFID Ultra-Rugged UHF RFID for the first time, fully charge the battery by placing it in the charging cradle until the LED Power/Charging indicator turns solid green.

The sled and mobile computer may be charged in the charging cradle individually or attached. The sled automatically powers on when removed from the charging cradle. The sled enters Off mode if it is idle for 30 minutes.

Charging using the eConnex Interface

The mobile computer can be charged using the eConnex interface when connected to the sled. Before attempting to charge a mobile computer using the eConnex interface, verify that the mobile computer is compatible with pass-through charging by viewing the Technical Accessory Guide available at zebra.com/support.



NOTE: The cradle does not charge the device if the battery is completely depleted or if it is not powered on.



NOTE: The Charge Terminal parameter must be enabled to charge the mobile computer.



NOTE: A 12V power supply must be connected to the power jack when charging the sled using the cable cup accessory.

UI Indicators

The sled presents multiple forms of feedback to inform the user of various device states. The sled provides LED definitions for decode and battery status as well as beeper indications to indicate battery charge progress.

LED Definitions

The sled provides user feedback in the form of LED indications for decode, battery, Bluetooth, and Wi-Fi states.

Decode LED Definitions

The following table outlines the context in which decode LED feedback is provided and the indication that is presented for a given device state.



NOTE: The LED indicators on the sled differ from the LED indicators on the mobile computer being used with the sled.

Table 2 Decode LED Indicators

Condition	Indication
Barcode Decode	Solid Green
Scan Error	Solid Red for two seconds.
RFID Decode	Solid Green
RFID Error	Solid Red for two seconds.
Read Error	Solid Red

Battery LED Definitions

The following table outlines the context in which battery LED feedback is provided and the indication that is presented for a given device state.

Table 3 Battery LED Definitions While Charging

Conditions	Indications
Charging	Amber (Blinking)
Battery Level Over 50%	Solid Green
Battery Level Over 20%	Solid Amber
Battery Level Under 10%	Solid Red
Battery Level Under 5% (entering Low Power Mode)	No LED

Table 3 Battery LED Definitions While Charging (Continued)

Conditions	Indications
Suspend/Low Power Mode	No LED
Fully Charged	Solid Green
Charging Error	Amber (Fast Blinking)

Bluetooth LED Definitions

The following table outlines the context in which Bluetooth LED feedback is provided and the indication that is presented for a given device state.

Table 4 Bluetooth LED Definitions

Condition	Indication
Off	Off
On/Not Connected	Off
Discoverable	LED Blinking
Reconnect/Pairing in Process	LED Fast Blinking
Paired/Connected	Solid Blue
Out of Range	Off

Wi-Fi LED Definitions

The following table outlines the context in which Wi-Fi LED feedback is provided and the indication that is presented for a given device state.

Table 5 Wi-Fi LED Definitions

Condition	Indication
Connecting	Green (Blinking)
Connected	Green (Stays On)
Transmission Error/Out of Range	Red (Stays On)

Beeper Indications

The sled provides user feedback in the form of beeper tones for decode, battery, Bluetooth, and Wi-Fi states.

Decode Beeper Indications

The following table outlines the context in which beeper feedback is provided and the indication that is presented for a specific decode event

Table 6 Decode Beeper Indications

Condition	Tone
Good Barcode Decode	Short high beep
Decode Transmission Error	Four long low beeps
Good RFID Decode	Short medium tone
RFID Error	Four long low beeps
Error Message (Other)	No beep
Sled Memory Full (Batch Mode)	Long tones for 5 seconds

Battery Beeper Indications

The following table outlines the context in which decode LED feedback is provided and the indication that is presented for a given device state.

Table 7 Battery Beeper Indications

Condition	Tone
Battery Level Over 50%	No beep
Battery Level Over 20%	No beep
Battery Level Under 10%	No beep
Battery Level Under 5% (entering Low Power Mode)	One beep
Suspend/Low Power Mode	Low/medium/high beeps
Fully Charged	One beep
Charging Error	Three beeps

Bluetooth Beeper Indications

The following table outlines the context in which beeper feedback is provided and the indication that is presented for a specific Bluetooth state.

Table 8 Bluetooth Beeper Indications

Condition	Tone
Off	No beep
On/Not Connected	No beep
Discoverable	No beep
Reconnect/Pairing in Process	No beep
Paired/Connected	Short Low/High beep

Wi-Fi Beeper Indications

The following table outlines the context in which beeper feedback is provided and the indication that is presented for specific Wi-Fi states.

Table 9 Wi-Fi Beeper Indications

Condition	Tone
On/Not Connected	No beep
On/Pairing in Process	No beep
On/Connected	Short/Low/High beep
Out of Range	Short/High/Low beep
Pairing Error	No beep
Off	No beep

Trigger Mapping Modes

The following table outlines the supported modes that can be mapped to the upper or lower trigger of the RFID sled.

Access Trigger Mapping using 123RFID Mobile from the Settings menu. For additional information, visit zebra.com/123RFID.

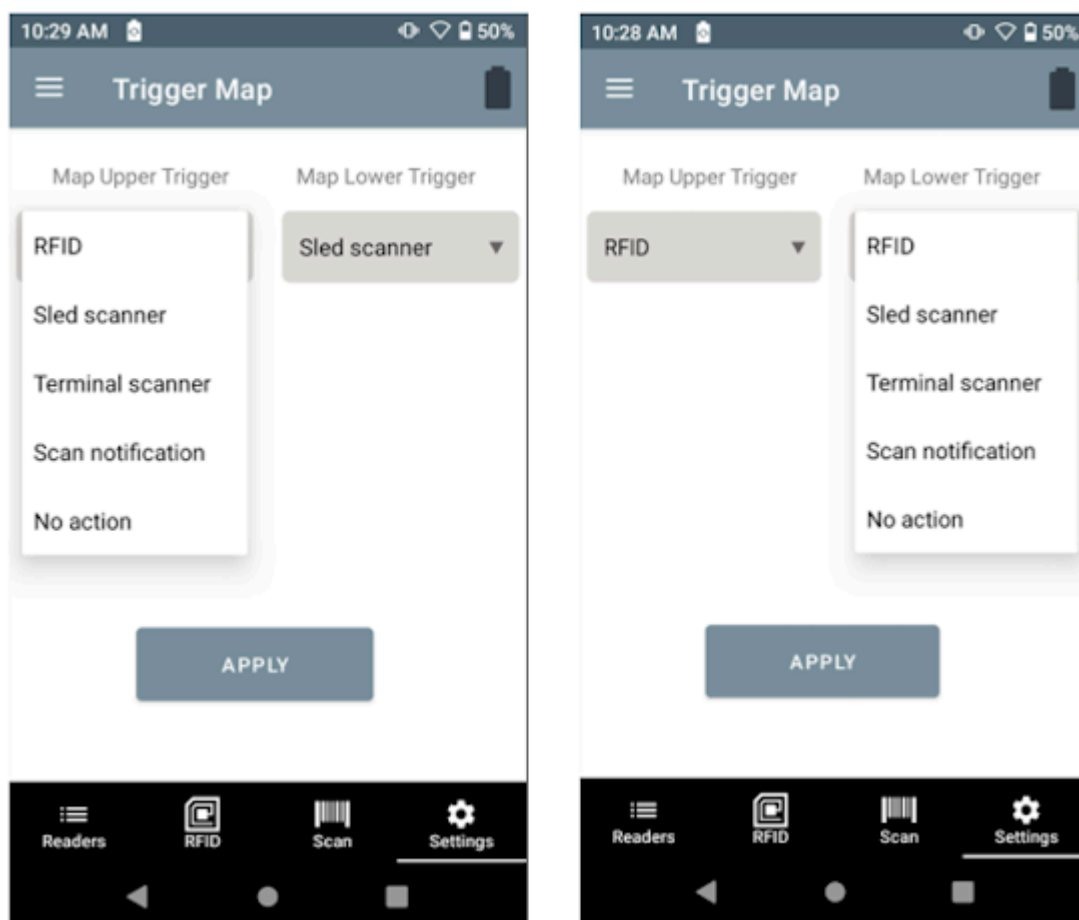


Table 10 Mappable Trigger Modes

Condition	Description
RFID Start/Stop	Start and stop RFID decode operations.
Sled Scanner	Barcode decode from the sled.
Terminal Scanner	Barcode decode from the mobile computer. Feature support is determined by the mobile computer being used with the sled.
Scan Notification	Scan trigger press notification.
No Action	No action when the trigger is pressed.

Wireless and Connectivity Functionality

The RFD90 sleds integrated Wi-Fi 6 capability allows for easy over-the-air (OTA) device management, while Bluetooth 5.3 and NFC tap-to-pair make it easier to connect to current and future Zebra mobile computers and third-party smartphones.

Wi-Fi Overview

The RFD90 sleds have advanced Wi-Fi 6 connectivity, supporting a range of IEEE protocols including 802.11ax/ac/a/b/g/n, and IPv4 compatibility. This ensures efficient wireless performance that is suitable for high-demand environments.

Data Rates

- 5 GHz Band - Achieves PHY data rates up to 1.2 Gbps, providing high-speed connectivity for demanding applications.
- 2.4 GHz Band - Supports PHY data rates up to 458 Mbps, ensuring reliable performance in various operational settings.

Security Protocols

- Personal Security - Supports WPA, WPA2, and WPA3 Personal protocols for enhanced security in personal network configurations.
- Enterprise Security - Offers WPA, WPA2, and WPA3 Enterprise protocols, including advanced features such as GCMP 256 encryption with SHA256 and Suite B 192 support for robust enterprise-level security.

These specifications emphasize the sled's capabilities to deliver high-speed, secure wireless connectivity, making them ideal for modern IoT and enterprise applications.

As a headless device, these sleds use the 123RFID companion applications or applications developed with the Zebra RFID SDK to configure Wi-Fi settings. These applications offer a set of options to manage connectivity.

Refer to [Wi-Fi Configuration](#) in the 123RFID Desktop user guide for more details.

Bluetooth Overview

The RFD90 sleds include Bluetooth 5.3 and offer enhanced connectivity, efficiency, and durability. Key features include a high tag read rate, a wider read range, increased battery capacity, and support for

various Zebra mobile computers. Bluetooth 5.3 allows for easy pairing with Zebra mobile computers and third-party devices.

Different Bluetooth security features are offered in these sleds as per [NIST.SP.800-121r2.pdf](#).

- Low Bluetooth Security (default) - The low security setting is designed for ease of connection with most devices and minimal user interaction. It uses the Just Works secure and simple pairing method with no Man-in-the-Middle (MITM) protection. It provides level 2 security (as per the Guide to Bluetooth Security).
- Medium Bluetooth Security - The medium security setting requires a passkey for the initial connection to pair the scanner to the remote host unless using NFC Out-of-Band (OOB). It uses the Passkey Entry secure and simple pairing method with MITM protection, which provides level 3 security (as per the Guide to Bluetooth Security).
- High Bluetooth Security - The high security setting requires Secure Connections (AES-128) between the sled (with scanner) and the remote host. A passkey must be scanned in unless using NFC OOB. It provides level 4 security (as per the Guide to Bluetooth Security).

Mobile Device Management Overview

This section provides information about the supported Mobile Device Management (MDM) partners.

The RFD90 sleds are designed to enhance Internet of Things (IoT) connectivity by leveraging the Message Queuing Telemetry Transport (MQTT) protocol, accessed through a predefined set of Application Programming Interfaces (API). This setup enables seamless integration with various IoT solutions, optimizing both device and data management processes. The connectivity provided by these devices supports real-time data exchange, efficient monitoring, and streamlined operations within the IoT ecosystems.

The partners involved in these IoT solutions are:

- 42Gears - 42gears.com
- SOTI - soti.net

Performing a Factory Default Reset on the Sled

The below function can be performed using a USB cable, cable cup or USB single slot cradles with a PC:

1. Disconnect and remove the battery and power sources from the sled.
2. Connect the sled to a power source using a USB cable, cable cup, or cradle. Observe the flashing battery LED.
3. Press and hold the upper trigger immediately within 5 seconds of connecting the sled to the power source. Insert the battery into the device within 30 seconds of connecting the sled to the power source.
4. Listen for the confirmation beep indicating that the factory default reset is about to begin and release the trigger.

The sled reboots with a factory reset default configuration.

Performing a Factory Reset By Scanning a Barcode

1. Pull the trigger to scan the Restore Defaults barcode:



2. Allow the sled to reboot.

The default factory settings are in place when the sled powers back on.

See Also

[Factory Reset](#)

[Saving an Online Configuration](#)

Maintenance

This chapter provides suggested sled maintenance, troubleshooting, and technical specifications.



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 Zebra 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.



IMPORTANT: Use pre-moistened wipes and do not allow liquid cleaner to pool. Ensure the following items are addressed when using sodium hypochlorite (bleach) based cleaners:

- For device only. Do not use on cradle.
- Always follow the manufacturer's recommended instructions: use gloves during application and remove the residue afterwards with a damp cloth to avoid prolonged skin contact while handling the device.
- Due to the powerful oxidizing nature of sodium hypochlorite, the metal surfaces, including electrical contacts on the device, are prone to oxidation (corrosion) when exposed to this chemical in the liquid form (including wipes) and should be avoided. In the event that these type of disinfectants come in contact with metal on the device, prompt removal with a dampened cloth after the cleaning step is critical.



IMPORTANT: To avoid damage to the device, use only approved cleaning and disinfecting agents listed below. The use of non-approved cleaning or disinfecting agents may void the warranty.

Harmful Ingredients

The following chemicals are known to damage the plastics on Zebra devices and should not come in contact with the device:

- Acetone
- Ammonia solutions
- Aqueous or alcoholic alkaline solutions
- Aromatic and chlorinated hydrocarbons
- Benzene

- Carbolic acid
- Compounds of amines or ammonia
- Ethanolamine
- Ethers
- Ketones
- TB-lysoform
- Toluene
- Trichloroethylene.

Tolerable Industrial Fluids and Chemicals

The following industrial fluids and chemicals were evaluated and deemed tolerable for the RFD90 RFID sled:

- Motor/Engine Oil
- Automatic Transmission Fluid (ATF)
- Continuously Variable Transmission Fluid (CVT)
- Industrial De-Greaser (Engine Brite Heavy Duty)

Cleaning the Sled

Routinely cleaning the exit window is required. A dirty window may affect scanning accuracy. Do not allow any abrasive material to touch the window.

To clean the device:

1. Dampen a soft cloth with one of the approved cleaning agents listed above or use pre-moistened wipes.
2. Gently wipe all surfaces, including the front, back, sides, top and bottom. Never apply liquid directly to the device. Be careful not to let liquid pool around the device window, trigger, cable connector or any other area on the device.
3. Be sure to clean the trigger and in between the trigger and the housing (use a cotton-tipped applicator to reach tight or inaccessible areas).
4. Do not spray water or other cleaning liquids directly into the exit window.
5. Wipe the device exit window with a lens tissue or other material suitable for cleaning optical material such as eyeglasses.
6. Immediately dry the device window after cleaning with a soft non-abrasive cloth to prevent streaking.
7. Allow the unit to air dry before use.

8. Connectors:

- Dip the cotton portion of a cotton-tipped applicator in isopropyl alcohol.
- Rub the cotton portion of the cotton-tipped applicator back-and-forth across the connector on the Zebra sled at least 3 times. Do not leave any cotton residue on the connector.
- Use the cotton-tipped applicator dipped in alcohol to remove any grease and dirt near the connector area.
- Use a dry cotton tipped applicator and rub the cotton portion of the cotton-tipped applicator back-and-forth across the connectors at least 3 times. Do not leave any cotton residue on the connectors.

Technical Specifications

The following table outlines the physical characteristics and user environment of the RFD90 UHF Ultra-Rugged RFID sled.

Table 11 RFD90 UHF Ultra-Rugged RFID

Item	Description
Physical Characteristics	
Dimensions	RFD9030: 189 x 83.4 x 173 mm /7.4 x 3.2 x 6.8 in RFD9090: 248 x 96.3 x 173 mm/9.8 x 3.8 x 6.8 in.
Weight	RFD9030 with SE4750MR: 25 oz./714 grams RFD9030 with SE4850: 26.5 oz./751 grams RFD9090 with SE4750MR: 26.8 oz./759 grams RFD9090 with SE4850: 28.2 oz./799 grams
Power	Quick-Release, PowerPrecision+ 7000 mAh Li-Ion battery
N/A	
Frequency Range/RF Output	US: 902-928 MHz; 0 - 30 dBm (EIRP) EU: 865-868 MHz; 0 - 30 dBm (EIRP) 916.3, 917.5, and 918.7 MHz; 0–30 dBm (EIRP) Japan: 916-921 MHz (w LBT); 0 - 30 dBm (EIRP)
User Environment	
Operating Temperature	-20°C to 55°C (-4°F to 131°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Charging Temperature	0°C to 40°C (32°F to 104°F)
Relative Humidity	Operating: 5 to 85% non-condensing
Sealing	IP65 (spray) and IP67 (submersion)
Drop Specification	Multiple 6 ft./1.8 m drops to concrete
Tumble Specification	500 cycles (1,000 drops, 1.6 ft./0.5 m) at room temperature

Table 11 RFD90 UHF Ultra-Rugged RFID (Continued)

Item	Description
Electrostatic Discharge	± 15 kV air discharge ± 8 kV direct discharge ± 8 kV indirect discharge

Troubleshooting

The following table outlines possible troubleshooting cases that may occur when using the sled related to data communication, barcode decode, and Bluetooth.

Table 12 Troubleshooting the RFD90

Problem	Cause	Solution
The RFID sled does not read tags.	The RF region configuration is not set.	Use the 123RFID Desktop or 123RFID Mobile application to set the regulatory region or country operation per the application instructions.
The RFID sled is attached to a mobile device and it is not responsive to a RFID application, even after the trigger is pressed.	The battery is too low and not able to power the RFID sled.	Press the trigger for a couple of seconds to power the RFID sled On. The RFID sled LED blinks amber when it is turned On. (By default, pressing the trigger turns On the RFID sled if it is in Off mode. However, the RFID sled can be disabled in which case this step is not necessary.) Place the RFID sled in the charging cradle. The RFID sled blinks amber LEDs indicating charging commenced.
	Zebra supported mobile computer is not properly inserted in the RFID Sled.	Reinsert the Zebra supported mobile device securely in the RFID sled and ensure that the USB cable is correctly inserted.
	Damaged battery.	If the sled LED does not blink amber after sitting on the charging cradle for a while, request service to replace the battery.
The sled is responsive but cannot read tags.	Battery is critically low.	Place the RFID sled in the charging cradle. The RFID Sled LED blinks amber. The RFID sled can be used when its LED turns on momentarily amber or green upon removal from the charging cradle.

Table 12 Troubleshooting the RFD90 (Continued)

Problem	Cause	Solution
The sled LED blinks fast amber when in the cradle.	Charging error.	Restart charging by removing the RFID sled from the cradle and inserting it back in the cradle. If the issue persists, request service to replace the battery.
The sled LED blinks red, or LED blinks red alternating with green or amber while in use (not while charging).	Battery end of life indication.	Request service to replace the battery.
Zebra supported mobile computer battery is not charging.	Charging cradle was unplugged from AC power.	Ensure the charging cradle is receiving power.
	The Zebra supported mobile computer is not fully seated in the cradle.	Remove and re-insert the zebra supported mobile computer into the cradle, ensuring it is firmly seated in the charging cradle.
Data Communication		
During data communication with a host computer, no data transmitted, or transmitted data was incomplete.	Sled removed from cradle during communication.	Replace the sled in the cradle and re-transmit.
	Incorrect cable configuration.	See the system administrator.
	Communication software was incorrectly installed or configured.	Perform setup.
During data communication over Bluetooth, no data transmitted, or transmitted data was incomplete.	Bluetooth radio is not on.	Turn on the Bluetooth radio.
	The sled moved out of range of another Bluetooth device.	Move within 10 meters (32.8 feet) of the other device.
Decode		
The sled does not decode with a reading barcode.	The scanning application is not loaded.	Load 123RFID Mobile on the device or 123RFID Desktop on the PC. See the system administrator.
	Unreadable barcode.	Ensure the symbol is not defaced.
	The distance between the exit window and the barcode is incorrect.	Place the device within proper scanning range.
	The device is not programmed to generate a beep.	If the sled does not beep on a good decode, set the application to generate a beep on good decode.
	The battery is low.	If the sled stops emitting a laser beam upon a trigger press, check the battery level. When the battery is low, the sled shuts off before the low battery condition notification.
Bluetooth		

Table 12 Troubleshooting the RFD90 (Continued)

Problem	Cause	Solution
The device cannot find any Bluetooth devices nearby.	Too far from other Bluetooth devices.	Move closer to the other Bluetooth device(s), within a range of 10 meters (32.8 feet).
	The Bluetooth device(s) nearby are not turned on.	Turn on the Bluetooth device(s) to find.
	The Bluetooth device(s) are not in discoverable mode.	Set the Bluetooth device(s) to discoverable mode.

