RFD90 Ultra-Rugged UHF RFID Sled

Product Reference Guide

ZEBRA

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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.

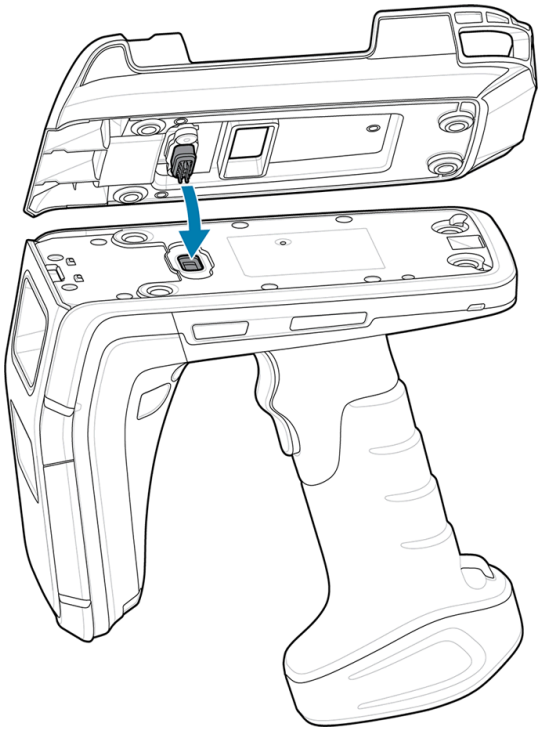
Adaptor Installation

To install an adaptor:

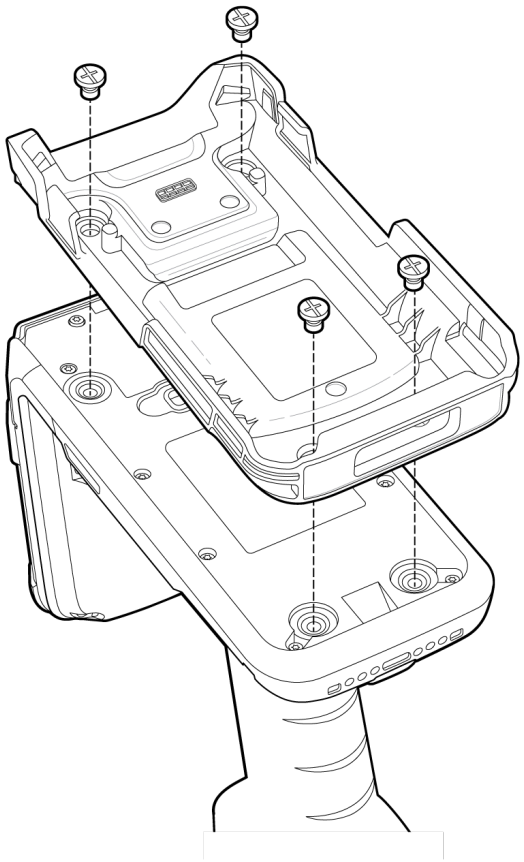
1. Remove the cover by pulling up on the lip.

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

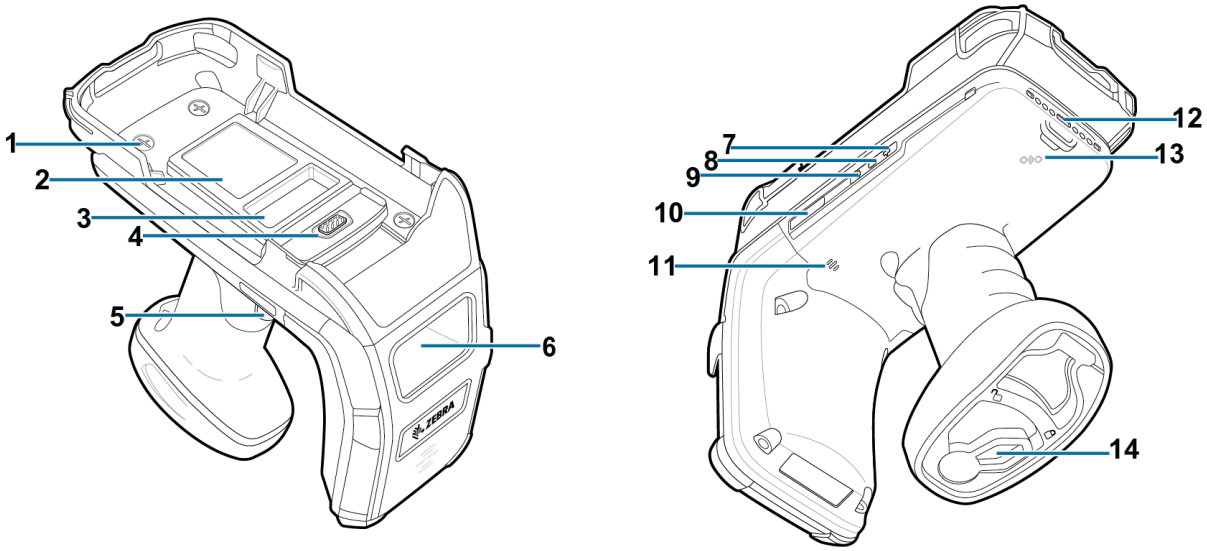


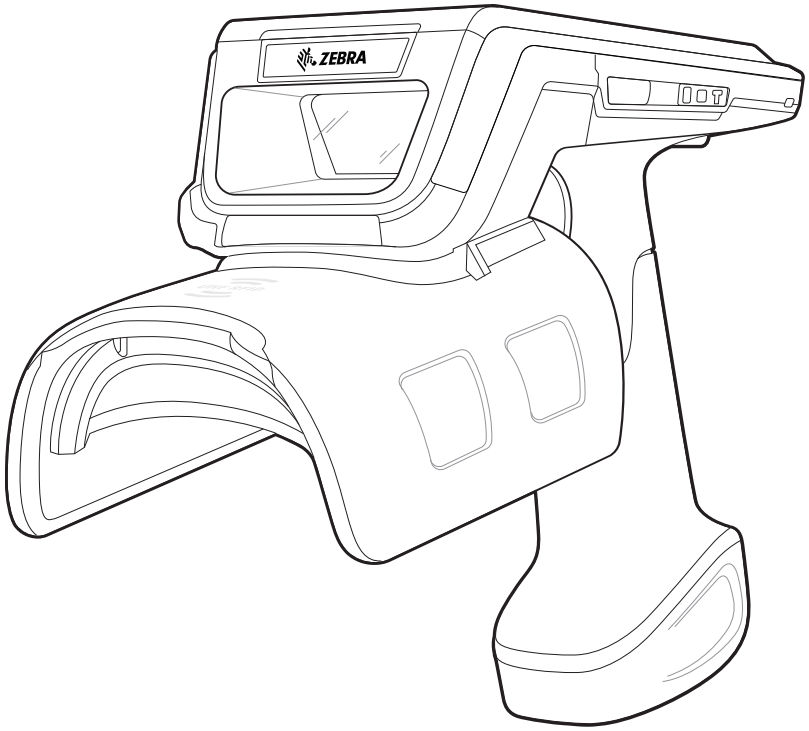
Table 1 RFD9030 Standard-Range Ultra-Rugged UHF RFID Sled Features

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

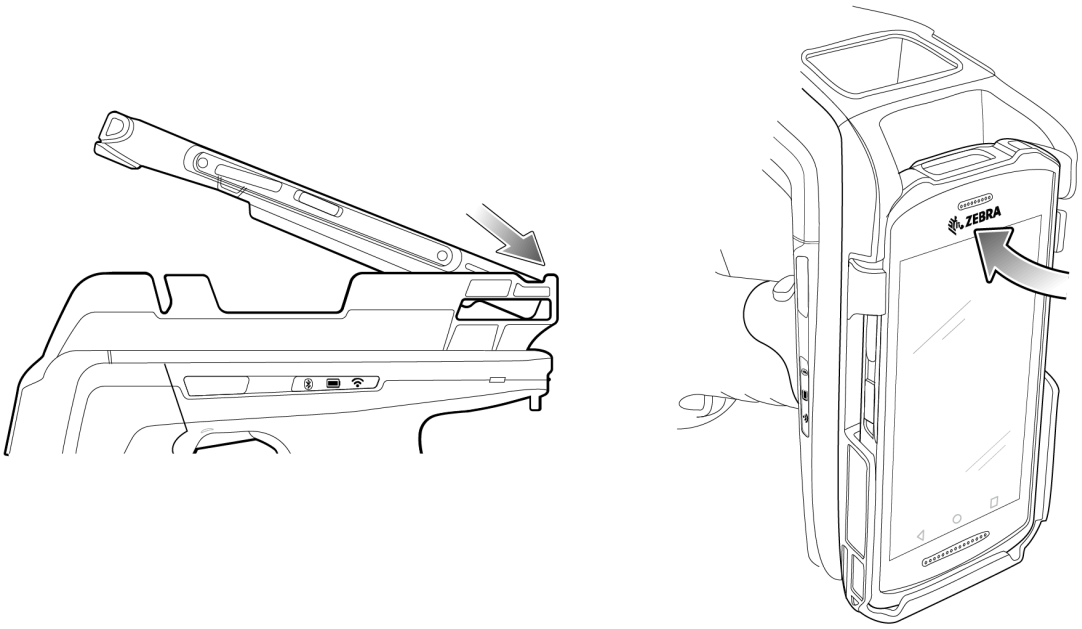


Device Installation

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

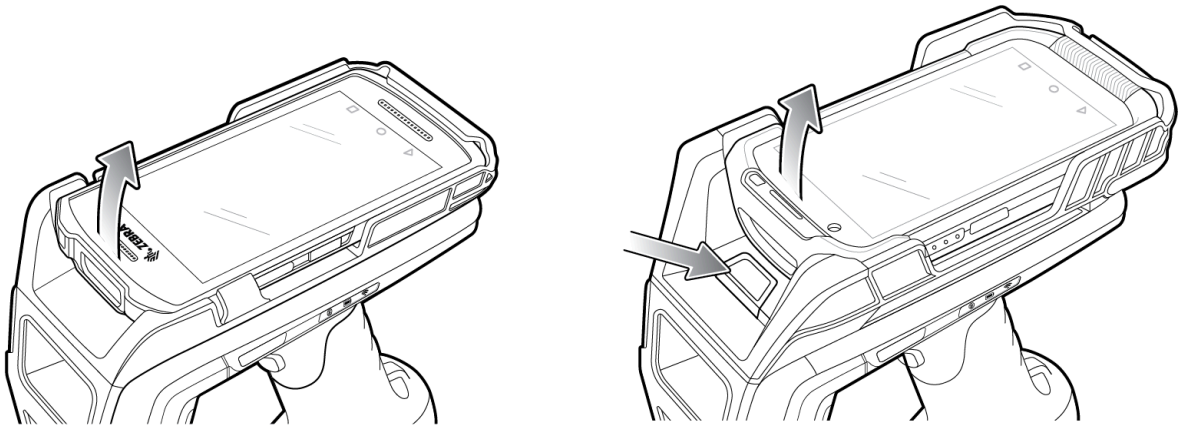


Device Removal

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

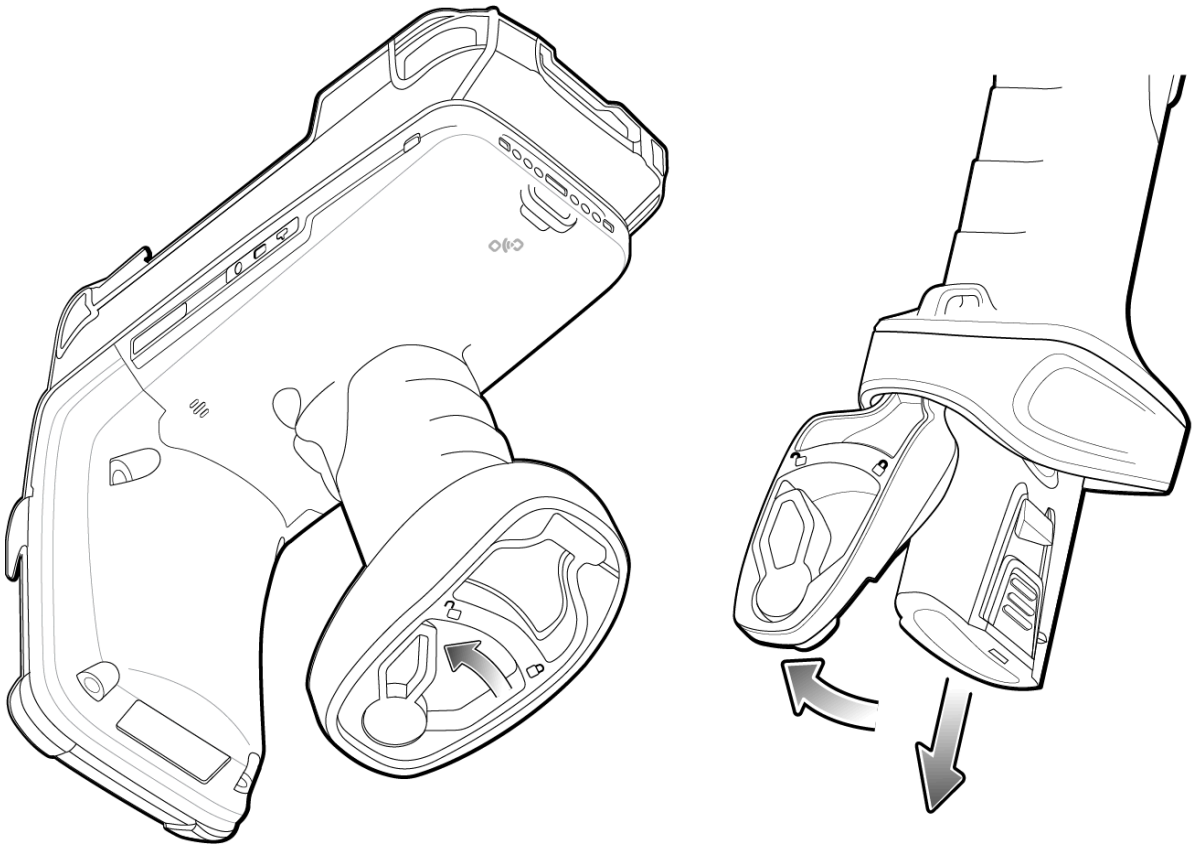


Battery Replacement

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:

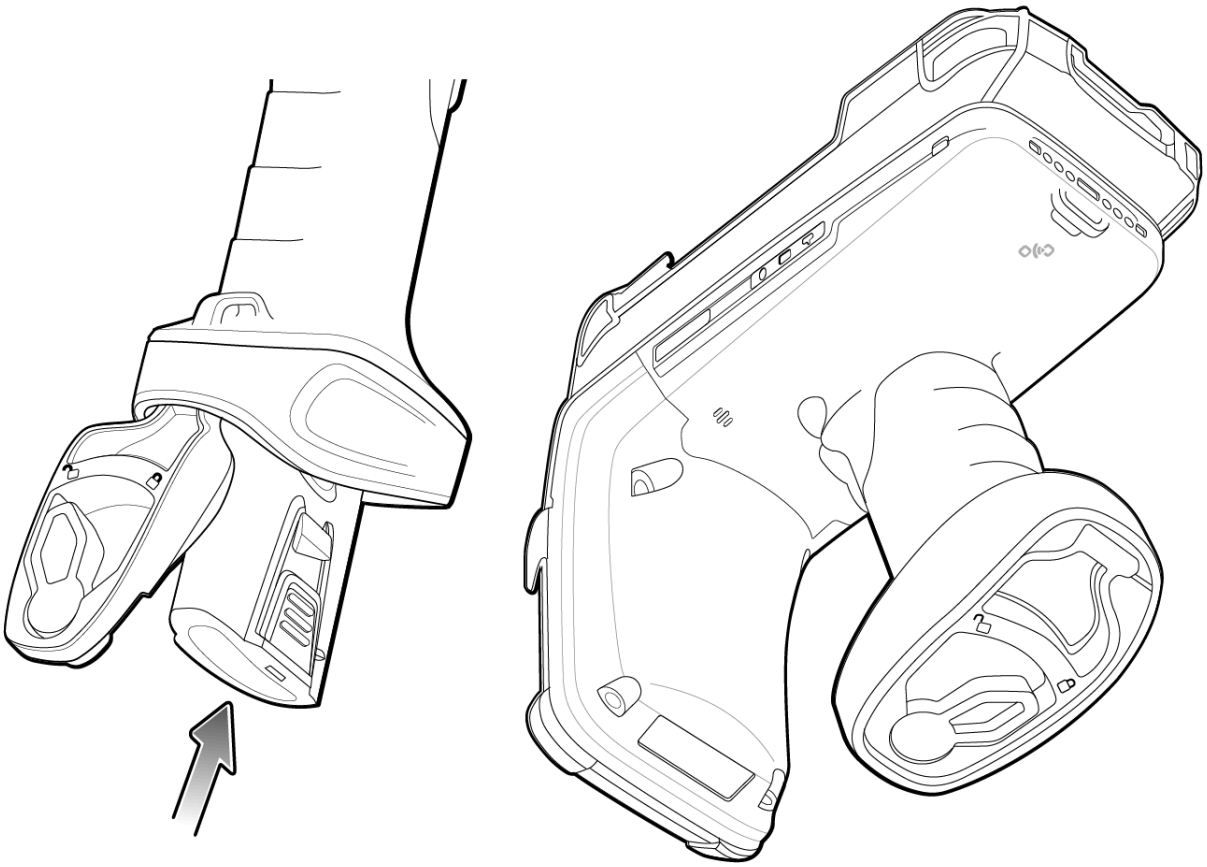
Figure 5 Battery Removal



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.

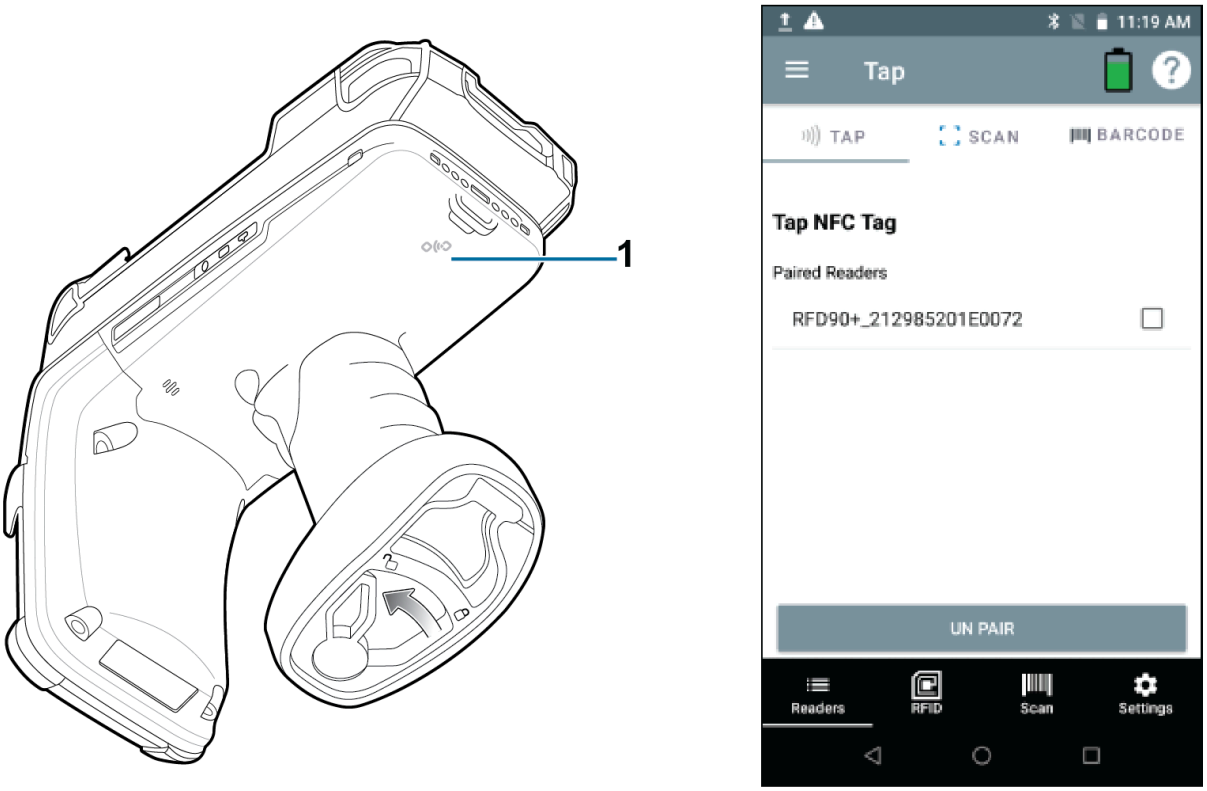
- To connect via scan, tap the **Scan** tab and scan the code on the sled using the mobile computer to obtain the Bluetooth MAC address and pair the device to the sled.

Figure 6 Scan 2D Barcode to Obtain MAC Address

1	2D Barcode on Bluetooth Connection Manufacturing Label

- 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

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

Disconnect Bluetooth Devices From RFD90 Using Parameter Barcode

Users can disconnect a terminal/phone from an RFD90 sled by scanning the barcode provided below.

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.

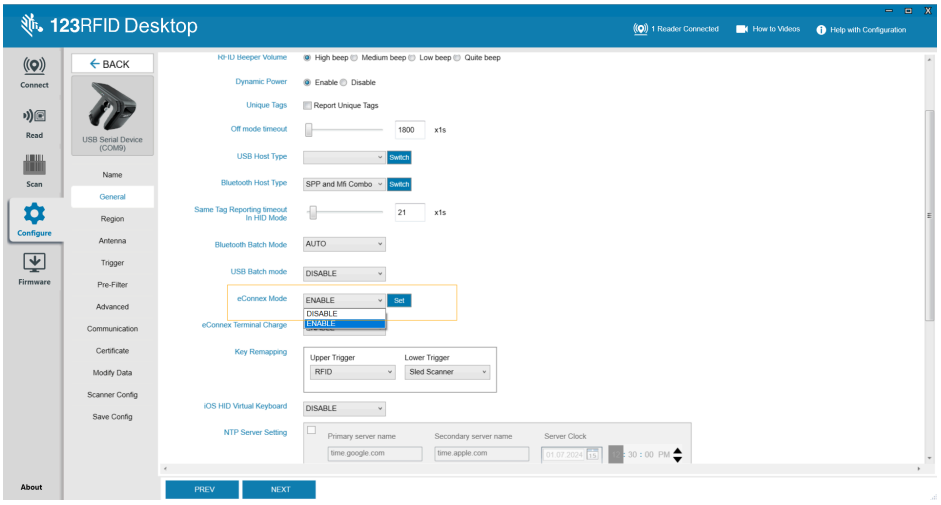
NOTE: The Charge Terminal parameter must be enabled to charge the mobile computer.

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

Option to Enable/Disable eConnex

Users have the option to enable or disable the eConnex port. This allows the use of the EMC Terminal with either the eConnex adapter for a wired connection or with Bluetooth for a wireless connection, making it easier to share RFD90 sleds between users.

By default, the RFD90's factory settings enabled the eConnex connectivity. The eConnex port can be disabled by using the 123RFID utility, as shown below.



Users can still use the triggers on the RFD90 to operate the terminal's scanner, even when the sled is docked in an eConnex adapter while using a Bluetooth connection.

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
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.

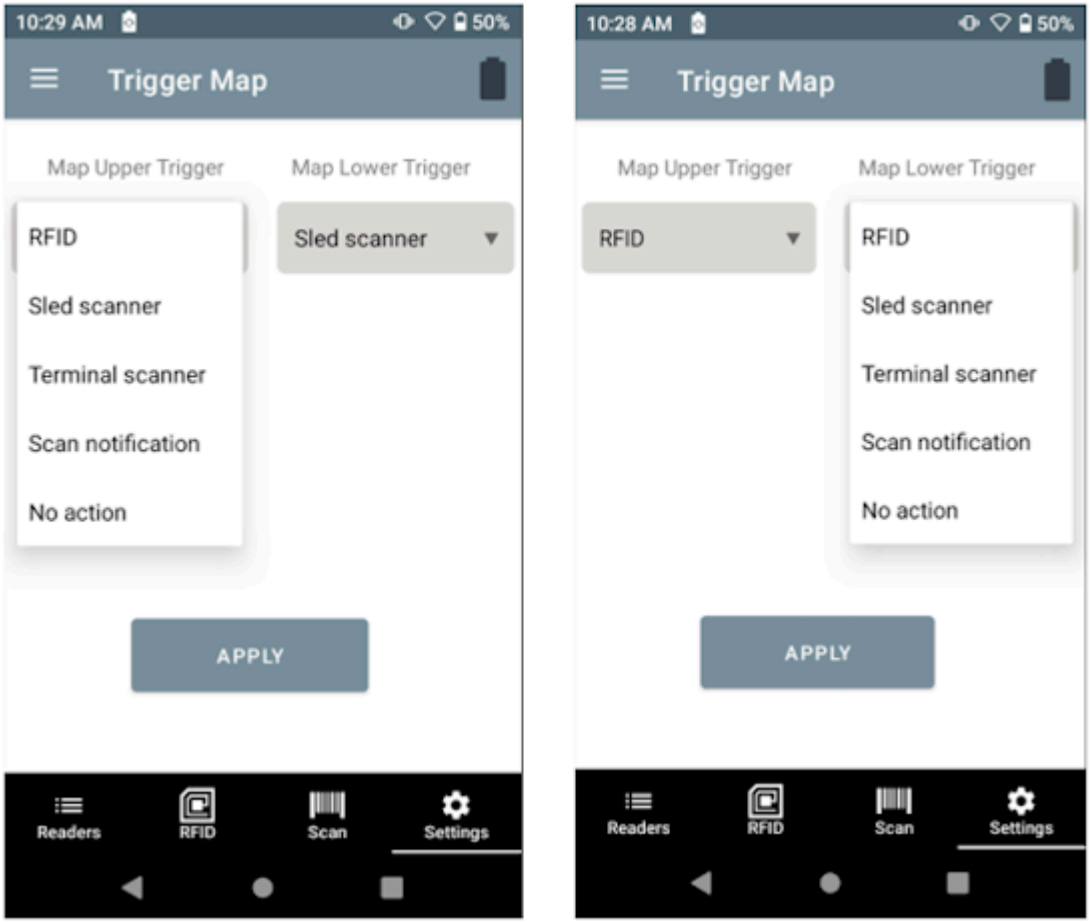


Table 10 Mappable Trigger Modes

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

WARNING: Users are responsible for configuring Wi-Fi security modes on RFD90 sleds for their own individual security requirements. To ensure compliance with the cybersecurity requirements of the EU Radio Equipment Directive (RED) Article 3.3 (d), use secure settings such as **WPA3 Standard**, **WPA3_Personal_SAE**, or **WPA3_Enterprise_GCMP_256_SUITEB_192** to protect against security threats. Improper configuration may lead to vulnerabilities, and the manufacturer is not liable for any resulting damages or breaches.

For more information about the implications of the EU Radio Equipment Directive (RED) for the RFD40/90, go to Compliance and Implications of EU RED for the RFD90.

NOTE: Recommended Security Mode: General recommendation for wireless security is to use the WPA3 Standard.

- For **Personal Networks**, the preferred security mode is **WPA3_Personal_SAE**.
- For **Enterprise-Grade Networks**, the preferred security mode is **WPA3_Enterprise_GCMP_256_SUITEB_192**, which offers the highest level of security.

RFD90 sleds support WPA2/WPA3 Personal and WPA2/WPA3 Enterprise security modes.

The following table outlines the supported protocols.

Protocol	Description	Support
WPA2_Personal_CCMP	• Uses the CCMP-128 AES Encryption with PSK. • Hashing Algorithm used is HMAC-SHA1. • 802.11w for WPA2 Personal is supported.	Supported
WPA3_Personal_SAE	• Uses the CCMP-128 AES Encryption with PSK (SAE). • Hashing Algorithm used is HMAC-SHA256.	Supported
WPA2_Enterprise_CCMP	• Uses the CCMP-128 AES Encryption with PMK derived from the EAP Authentication exchange with the RADIUS server. • Hashing Algorithm used is HMAC-SHA1. • Protected Management Frames (PMF) are optional.	Supported
WPA3_Enterprise_CCMP	• Uses the CCMP-128 AES Encryption with PMK derived from the EAP Authentication exchange with the RADIUS server. • Hashing Algorithm used is HMAC-SHA256. • Protected Management Frames (PMF) are mandatory.	Supported
WPA3_Enterprise_GCMP_256_SHA256	• Uses the GCMP-256 AES Encryption with PMK derived from the EAP Authentication exchange with the RADIUS server. • Hashing Algorithm used is HMAC-SHA256. • Protected Management Frames (PMF) are mandatory.	Supported

Protocol	Description	Support
WPA3_Enterprise_GCMP_256_SUITEB_192	• Uses the GCMP-256 AES Encryption with PMK derived from the EAP Authentication exchange with the RADIUS server. • Hashing Algorithm used is HMAC-SHA384 • Protected Management Frames (PMF) are mandatory.	Supported

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

Compliance and Implications of EU RED for the RFD90

This chapter provides detailed information on the definition of BS EN 18031-1 and the EU Radio Equipment Directive (RED). It also addresses the compliance and implications for RFD90 devices.

About BS EN 18031-1 & The EU Radio Equipment Directive (RED)

BS EN 18031-1 is a technical standard that provides a detailed cybersecurity checklist for any "internet-connected radio equipment" sold in the EU.

It was created to enforce the EU's Radio Equipment Directive (RED), which made cybersecurity a mandatory legal requirement for these devices. The standard translates the broad legal goal of "not harming the network" into specific, testable engineering requirements.

For manufacturers, complying with this standard provides a **"presumption of conformity"**. It means their product is legally presumed to meet the cybersecurity obligations of the RED, which is essential for placing the CE mark on the product and selling it in the EU market.

Applicability of BS EN 18031-1 for the RFD90 Sled

The RFD90 sled is subject to this standard. It contains Wi-Fi and Bluetooth radios, and it is designed to be internet-connected, placing it directly in the scope of the RED cybersecurity regulation. Compliance is a mandatory requirement for market access.

Security is Based on "Environmental Controls"

The key to the RFD40/90's compliance strategy is that it is an enterprise device, not a standalone consumer product. Its security model relies heavily on its intended operational environment. The standard is designed to accommodate this through its "except for" clauses.

How Compliance is Justified

- **Access Control (ACM) & Authentication (AUM)**

  To view/modify any sensitive security parameters listed below, the user needs to enter a valid authorization password.

  - Endpoint configuration
  - Active endpoint configuration
  - Endpoint names
  - configuration
  - Certificate configuration
  - NTP server details
  - Sled time
  - Bluetooth Security level
- **Secure Communication (SCM)**

  This is applicable because Wi-Fi & Bluetooth are wireless. The sled **PASSES** by implementing strong, authenticated encryption protocols such as **WPA2**, **WPA3**, and **Bluetooth 5.1** standards.
- **Best Practice Cryptography (CRY)**

  This is applicable. The sled **PASSES** by demonstrating that its WPA3 modes are the "best practice", while its older WPA2 modes are included as a "justified deviation for interoperability" to support legacy enterprise networks.

The standard provides the mandatory rulebook, and Zebra justifies the RFD40/90's compliance by demonstrating how it meets those rules. Either directly on the device or through the mandatory security of the host computer and the operating environment.

Applicability of BS EN 18031-1

Currently, the changes related to BS EN 18031-1 are applicable only to European Union countries that adhere to the BS EN 18031-1 standards. For a comprehensive list of these countries, refer to Annexure 1.

Parameters Protected by Authorization Password

As per the principles of BS EN 18031-1, the protected parameters are as follows:

- Configuration – Includes SSID, Security Type (WPA2/WPA3), Pre-Shared Keys (Passwords), and Enterprise Credentials (usernames, passwords, and certificates for 802.1X).
- NTP Server Details – Includes information about the time server URL, from which the device retrieves updated time.
- Bluetooth Security Level - These levels correspond to different security protections against attacks, such as Man-in-the-Middle and DDoS.
- IoT Endpoint configuration includes MQTT broker address, port, username, password, endpoint name, and certificates.
- Sled Time – RFD90 does not include RTC, the authorized user can update time using 123RFID tools/ SDK, or the Same will be updated using NTP.

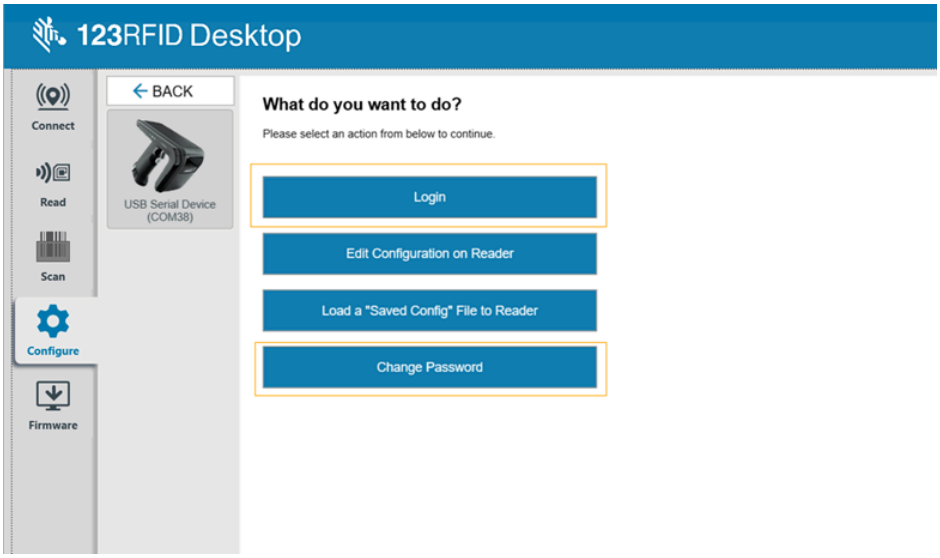
- Bluetooth Security Level - These levels correspond to different security protections against attacks such as Man-in-the-Middle and DDoS.
- Authorization Password – Password used for device authorization.

Default Authorization Password & Update

Users can connect to the sled and perform basic operations, such as setting the region, performing inventory, scanning operations, and more. Without authorization, a password is required to view or modify sensitive security & network assets authorization.

By default, the authorization password is set to "*zebraRfid@1111*", which needs to be changed before accessing any of the listed protected parameters. The user can utilize the Change Password option to change the default password.

After changing the password, the user can use the Login option for authorization.



About the Authorization Session & Password Criteria

- RFD90 sleds admin login session expires after 10 minutes if there is no user activity.
  - The desktop application maintains probes for IoT status, Wi-Fi status, and battery status when the application is on the READ page and the Communication page, which keeps the authorization session active.
- If there is any interface change (Connect/disconnect USB, switch between USB/eConnex/Bluetooth), then the login session expires.
- The brute force mechanism is in place as follows:
  - Allow up to five incorrect login sessions.
  - After the sixth unsuccessful login attempt, each subsequent attempt will be delayed by 30 seconds.
  - The password must contain one uppercase letter, one lowercase letter, one special character, and one numeric value.

Bluetooth Settings

The Bluetooth settings remain unchanged for regions that do not adhere to the 10831-1 standards. However, in regions where compliance with the 10831-1 norms is mandatory, the default Bluetooth security level is automatically set to '**User Authorization**'. In this mode, when the user initiates pairing from the mobile terminal, they must press the upper trigger on the Sled within 15 seconds to complete the pairing process. If the trigger is not pressed within the specified time, the pairing attempt will fail.

This requirement ensures physical intervention, aligning with the 10831-1 compliance standards.

The different security levels are as follows:

1. Low - Only works in pairing mode without any authorization.
2. Medium - With a numeric pass key, users must scan numeric codes using the sled scanner (applicable only to sleds with scanner support).
3. High – With a numeric pass key, users need to scan a numeric code using the sled scanner (applicable only to sleds with scanner support).
4. User Authorization – Only works with the upper trigger press to confirm the pairing request from a Bluetooth terminal.

Wi-Fi Settings

The wi-fi settings remain unchanged for regions that do not adhere to the 10831-1 standards. However, in regions where compliance with the 10831-1 norms is mandatory, users need to enter authorization passwords to view or configure the wi-fi profiles.

IoT Endpoint Configuration

The IoT endpoint configurations remain unchanged for regions that do not adhere to the 10831-1 standards. However, in regions where compliance with the 10831-1 norms is mandatory, users need to enter authorization passwords to view or configure the IoT endpoint configuration.

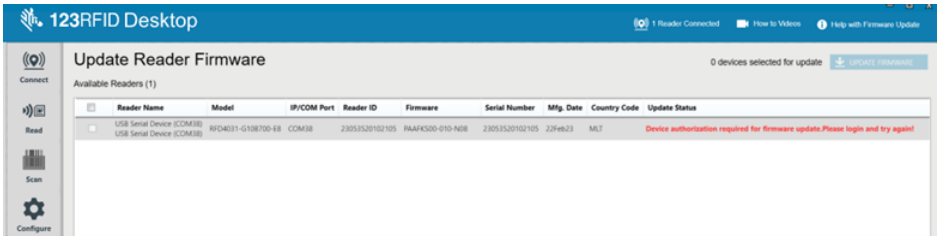
Certificate Management

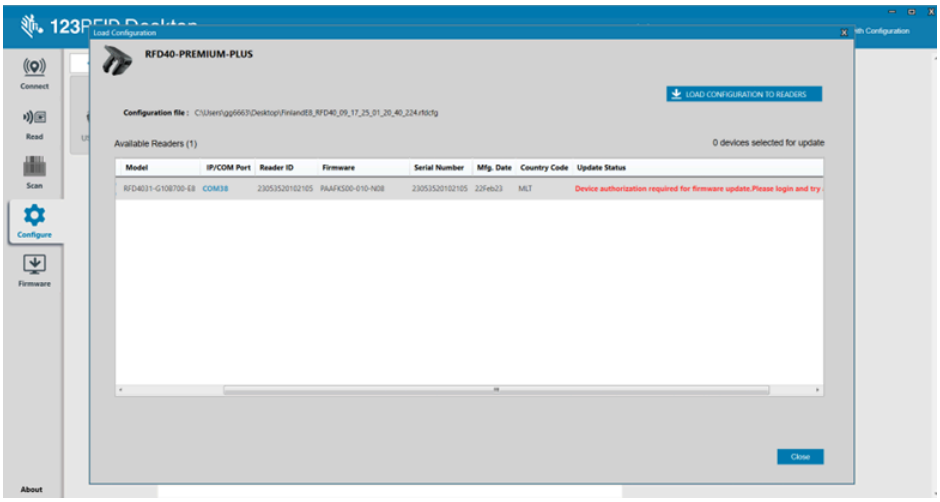
The certificate management remains unchanged for regions that do not adhere to the 10831-1 standards. However, in regions where compliance with the 10831-1 norms is mandatory, users need to enter authorization passwords to view, modify, or delete certificates.

Firmware & Configuration file Update

The firmware and configuration file update process remains unchanged for regions that do not adhere to the 10831-1 standards. However, in regions where compliance with the 10831-1 norms is mandatory, users need to enter authorization passwords to perform a firmware update.

Example:

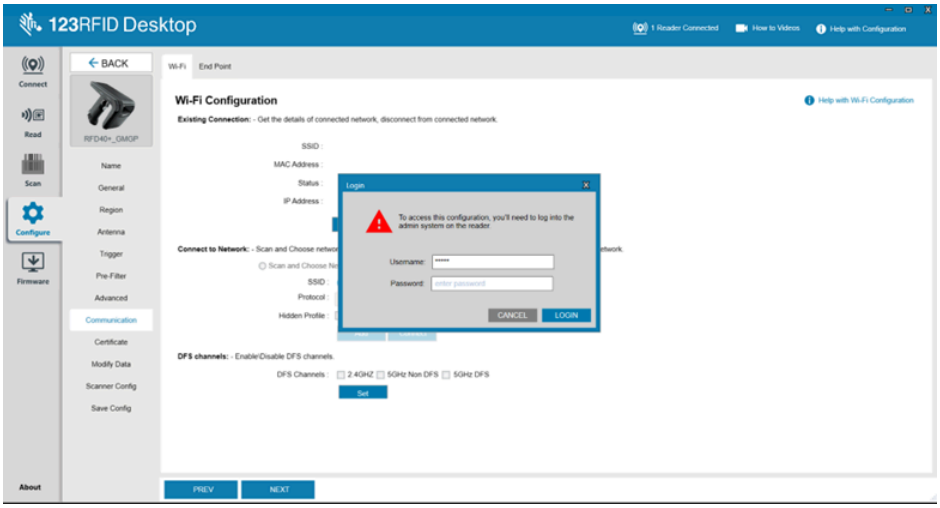




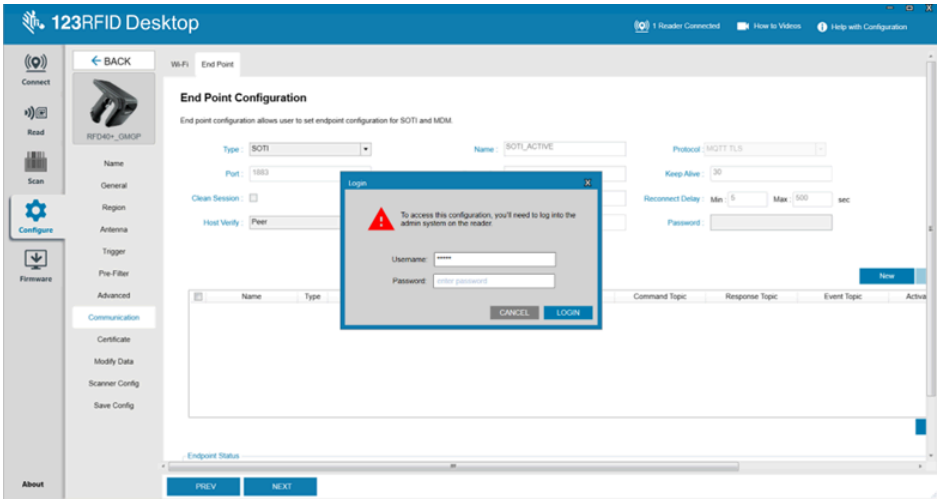
Device Authorization Using Authorization Password

If the user tries to access the protected parameters, then RFD90 sled reports an authorization error. In the 123RFID application, the authorization password prompt will be displayed as shown below.

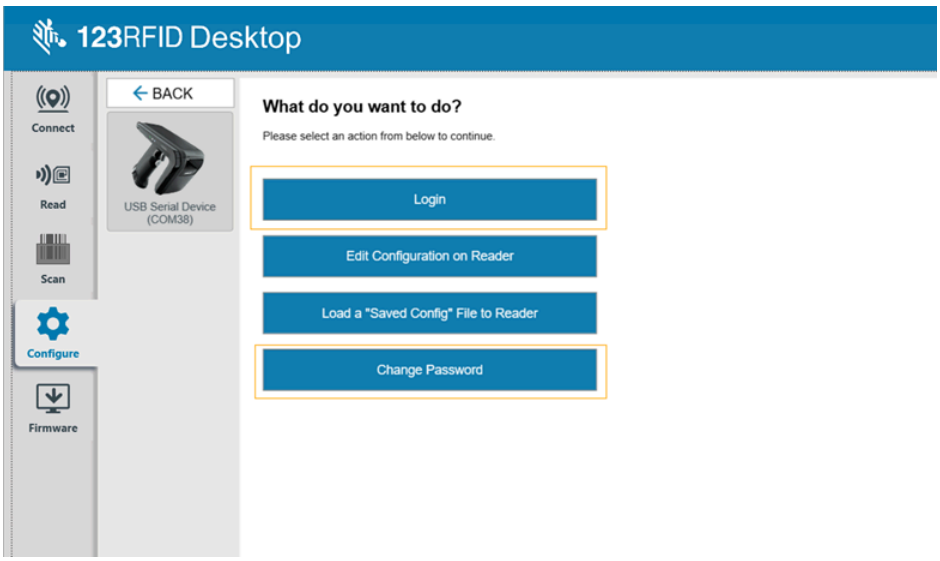
To view wi-fi status



To view configured endpoints



Users can enter the authorization password when they have an authorization password prompt, or can log in directly using the login option, as shown below.



Impact on IoT Connectivity

The IoT endpoint configurations remain unchanged in regions that do not require adherence to the 10831-1 standards. However, in regions where compliance with the 10831-1 norms is mandatory, users must provide authorization passwords to access or modify the IoT endpoint configurations.

The IoT APIs and their functionality remain unaffected because the IoT system employs secure TLS/MTLS-based connections, ensuring that the communication channel is secure and fully compliant with the 10831-1 standards.

Impact on Current Applications & Best Migration Approaches

The authorization password is mandatory in regions where compliance with the 10831-1 norms is mandatory. Users in these regions are impacted by 108131-1 related sled firmware & SDK/Tools related changes.

NOTE: This is based on the consideration that the firmware update is performed from 007-R00 onwards.

Suggested Migration Approaches

The following are the suggested approaches to adopt to new changes.

- If the Sled's Wi-Fi, Bluetooth, Certificates, or IoT features are not utilized:
  - No impact, users can still use older applications as it is.
  - Bluetooth pairing needs a user authorization (Upper trigger press confirmation for new pairing – Refer to Bluetooth settings section).
- For firmware update or loading configuration file, use the following flow:
  - Change default authorization password (one-time process).
  - using the new updated authorization password.
  - Perform a firmware update or load the configuration file.
- Sled's Wi-Fi, Bluetooth, certificates, or IoT features are used:
  - Change default authorization password (one-time process).
  - Connect to the sled and log in using the new, updated authorization password, or perform an admin connection to the sled.
  - Bluetooth pairing needs a user authorization (Upper trigger press confirmation for new pairing – Refer to Bluetooth settings section).

NOTE: For details, refer to SDK & Tools/API documentation:

1. 123RFID desktop guide
2. 23RFID Mobile guide

Annexure 1

The following is the list of European Union countries where BS EN 18031-1 standards are applicable.

SL NO	EU RED Country list	WR SKU with 900M Support	E8 SKU Support	Remarks
1	Austria	Yes	Yes	
2	Belgium	Yes	Yes	
3	Bulgaria	Yes	Yes	
4	Croatia	Yes	Yes	
5	Cyprus	Yes	Yes	

SL NO	EU RED Country list	WR SKU with 900M Support	E8 SKU Support	Remarks
6	Czech Republic	Yes	Yes	
7	Denmark	Yes	Yes	
8	Estonia	Yes	Yes	
9	Finland	Yes	Yes	
10	France	Yes	Yes	
11	Germany	No	Yes	
12	Greece	No	Yes	
13	Hungary	Yes	Yes	
14	Iceland	Yes	Yes	
15	Ireland	Yes	Yes	
16	Italy	No	Yes	
17	Latvia	Yes	Yes	
18	Liechtenstein	Yes	Yes	
19	Lithuania	Yes	Yes	
20	Luxembourg	No	Yes	
21	Malta	No	Yes	
22	Netherlands	No	Yes	
23	Norway	Yes	Yes	
24	Poland	No	Yes	
25	Portugal	Yes	Yes	
26	Romania	Yes	Yes	
27	Slovakia	Yes	Yes	
28	Slovenia	Yes	Yes	
29	Spain	Yes	Yes	
30	Sweden	Yes	Yes	
31	Switzerland	Yes	Yes	
32	Turkeye	No	Yes	
33	Albania	No	Yes	
34	Andorra	No	Yes	
35	Bosnia Herzegovina	No	Yes	
36	French Guiana	No	Yes	
37	Georgia	No	Yes	
38	Guadeloupe	No	Yes	
39	Macedonia	No	Yes	

SL NO	EU RED Country list	WR SKU with 900M Support	E8 SKU Support	Remarks
40	Martinique	No	No	Not supported by RFD40
41	Monaco	No	Yes	
42	Montenegro	No	Yes	
43	Reunion Isl.	No	No	Not supported by RFD40
44	San Marino	No	No	Not supported by RFD40
45	Sao Tome and Principe	No	No	Not supported by RFD40
46	St Pierre & Miquelon	No	No	Not supported by RFD40
47	Vatican City	No	No	Not supported by RFD40

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.