UHF RFID SLED for PM90

RF900

User Manual

Instruction

RF900 is a UHF RFID sled for PM90. This manual provides information about basic features and using the RF900. Please read this manual carefully before using your UHF RFID reader to ensure safe and proper use.

Revision History

Revision	Date	Description
V01	29 Oct 2021	Initial release
V02	01 Nov 2021	Updated charging scenario Added note for appending Wedge - prefix and suffix
V03	24 Nov 2021	Updated cradle (SSC) charging scenario

Related Document

Following documents are related to RF900. Download the documents on Service Portal > Download > RFID Control Apps & Document.

- RFID Control User Guide – describes how to use the RFID Control and RFID Demo applications.
- RFID Control Configuration Tool User Guide – describes how to use the RFID Control

    Configuration Tool.

RF900 SKUs

The contents of this manual can cover the following SKUs.

SKU	Part Number	RFID Engine	Location
SKU1	RF900-00RY-2	Impinj® Indy® R2000	EU
SKU2	RF900-00RY-5		US, KR

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Device Parts

Figure 1 RF900 Views
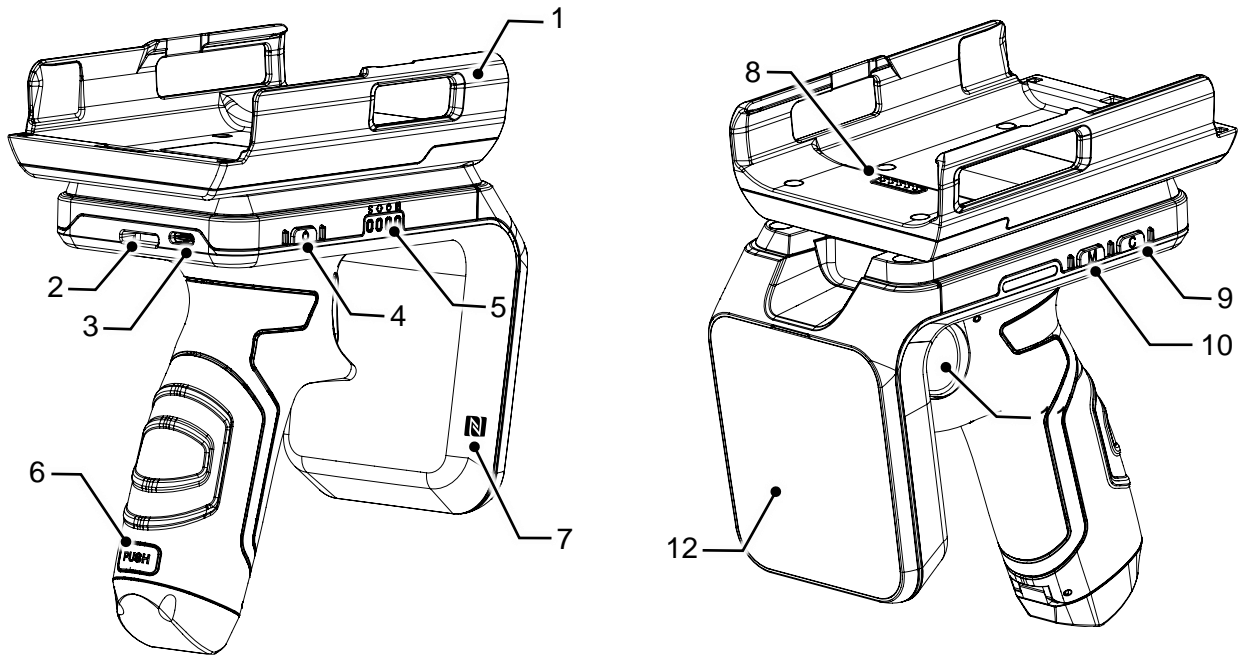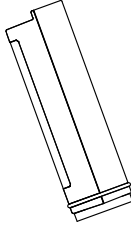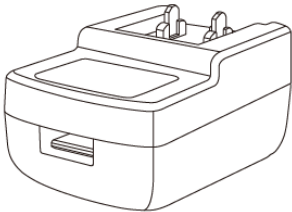
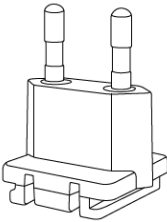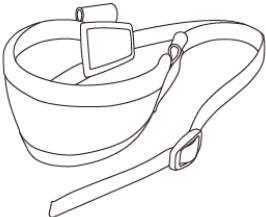| No	Name	Description
1	PM90 retention fixture	Install PM90 onto this part
2	Hand strap hole	Attach hand strap
3	USB Type C connector	USB 2.0 Type C. Plug USB cable to charge the RF900
4	Power button	Press and hold to turn on/off the RF900
5	LED indicator	Indicate the status of power, battery charging, connect mode, trigger mode. Find more details in LED Indicator
6	Battery release button	Press to open battery cover and replace the battery
7	NFC Tag	Connect PM90 using Tap-to-Pair
8	PM90 connector	Connector for communication with PM90
9	Connect mode change button	Press and hold to change the connect mode
10	Trigger mode change button	Press and hold to change trigger mode, barcode scanning or RFID tag reading
11	Trigger button	Read RFID tags or barcode by pressing
12	UHF RFID antenna	Read RFID tags

Getting Started

Product Standard Accessories

The following items are in the product box.

Accessory	Name
	Battery pack
	5V / 2A power adapter
	AC plug
	USB type C cable
	Hand Strap

Getting Started

Getting Started

Charge the Device

⚠️ *Caution: Always use an original charger and cable from Point Mobile. Other chargers and cables may damage RF900. Also, make sure the connector, charger, cable is not wet.*
Follow the Battery Safety Information for safety of using the battery.

Charge with AC/DC adaptor

1. Assemble the AC plug and power adapter.
2. Plug USB type C cable to the power adapter.
3. Connect the cable to USB connector of RF900.
4. Provide power by plugging the power adapter to the power outlet.

Figure 2 Charge RF900 (Adapter)
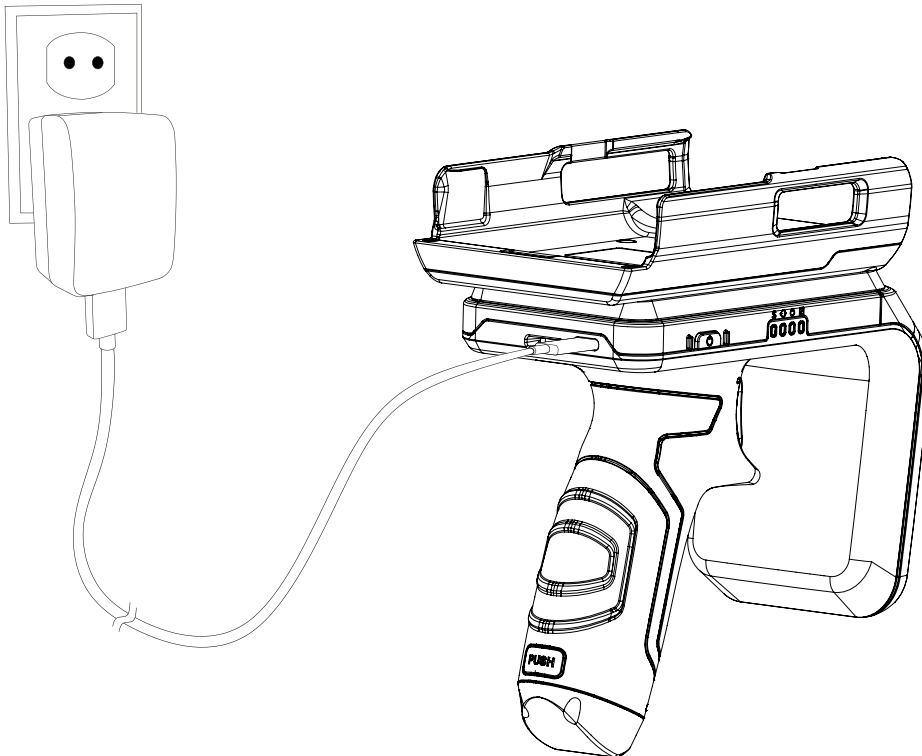
ℹ️ *Note: If the adapter is connected to RF900 with PM90 mounted, only RF900 will be charged.*
Conversely, if the adapter is connected to PM90, PM90 will be charged first, and RF900
starts charging after PM90 is fully charged.

Getting Started

Charging with Cradle

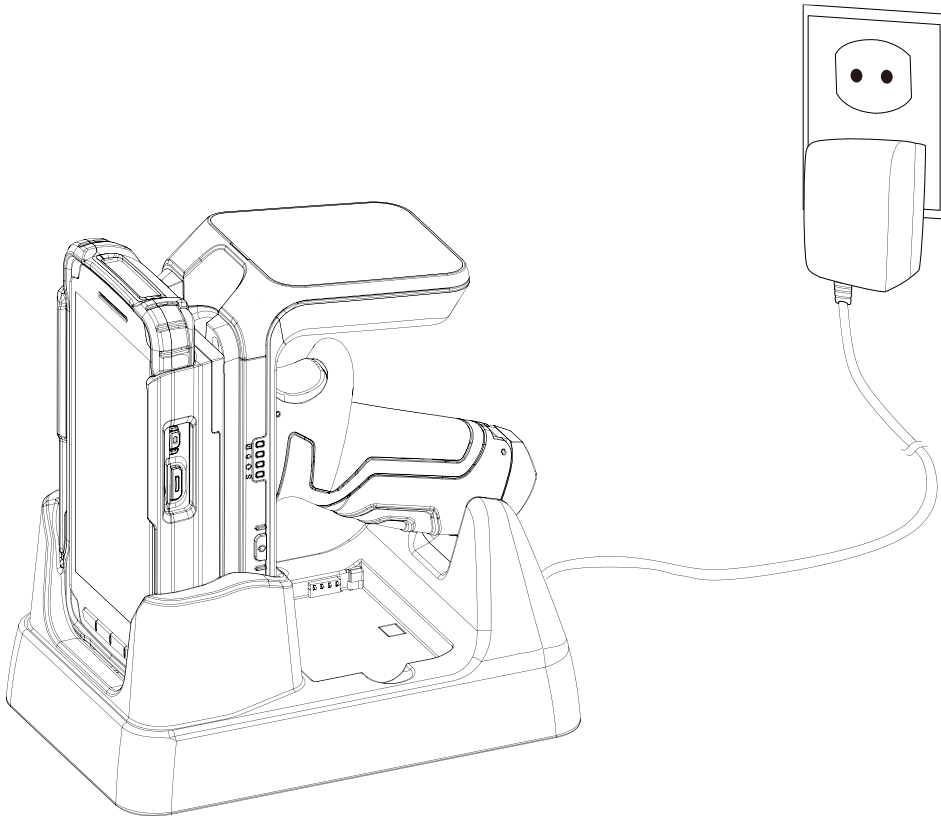### SSC (Single Slot Cradle)

Figure 3 Charging with RF900 and PM90 (SSC)

Charge the RF900 with PM90 mounted through the cradle (Optional accessory: PM90-SSC2, PM90-SSC2-5). Place the device onto the cradle as shown in Figure 3.

i ***Note:*** *If you use the cradle to charge, PM90 and RF900 will be charged simultaneously.*

Getting Started

4SBC (4 Slot Battery Cradle)

4SBC is a charging cradle for the battery of Point Mobile RFID sled models.

All RFID reader's replaceable batteries can be charged with 4SBC. And the cradle can charge up to 4 batteries at the same time.

Insert the battery into the slot with correct orientation. The LED indicator next to the slot will light up to confirm the charging. (Red – Charging / Green – Fully charged)

Find more detail in RF851 4SBC Quick Start Guide.

Figure 4 Charge battery with 4SBC
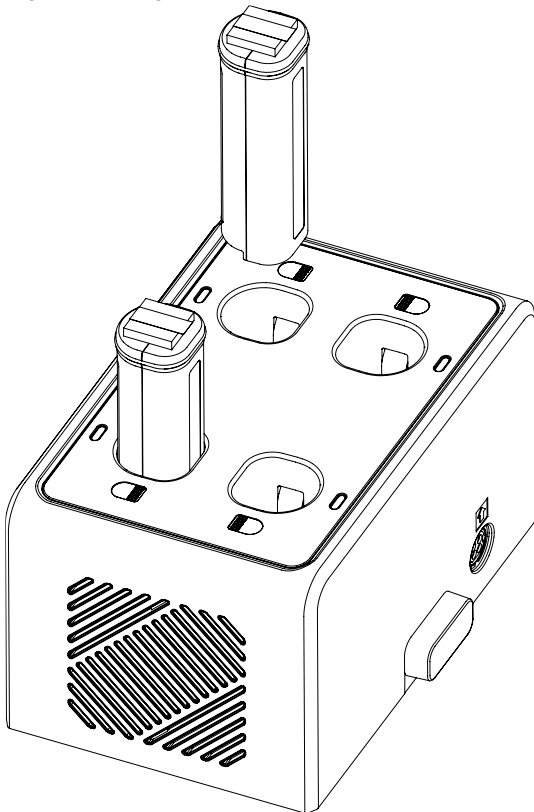
Getting Started

Turn on/off the Device

To turn on or off the RF900, press and hold the power button next to the LED indicator for 2 seconds (Until the RF900's LED indicator lights on/off).

Figure 5 RF900 Power button
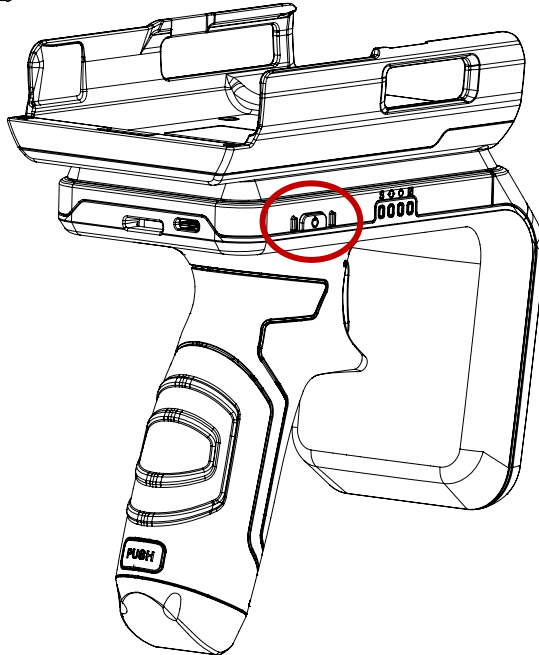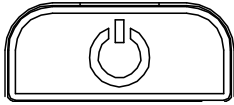
Getting Started

Replace the Battery

When the battery level is low, replace the battery with a charged one.

1. Press Battery release button on the back of the handle to open the battery cover.

Figure 6 Battery release button

2. Remove the battery by pulling the strap on the battery and replace the battery.

Figure 7 Replace battery

3. Close the battery cover firmly until it clicks.

Getting Started

LED Indicator

Figure 8 RF900 LED Indicator

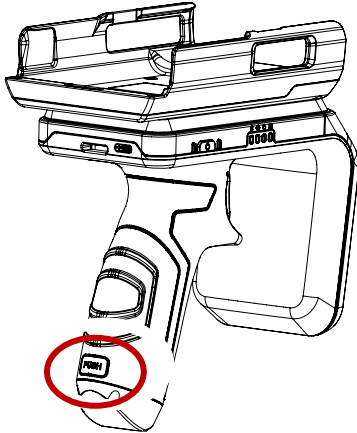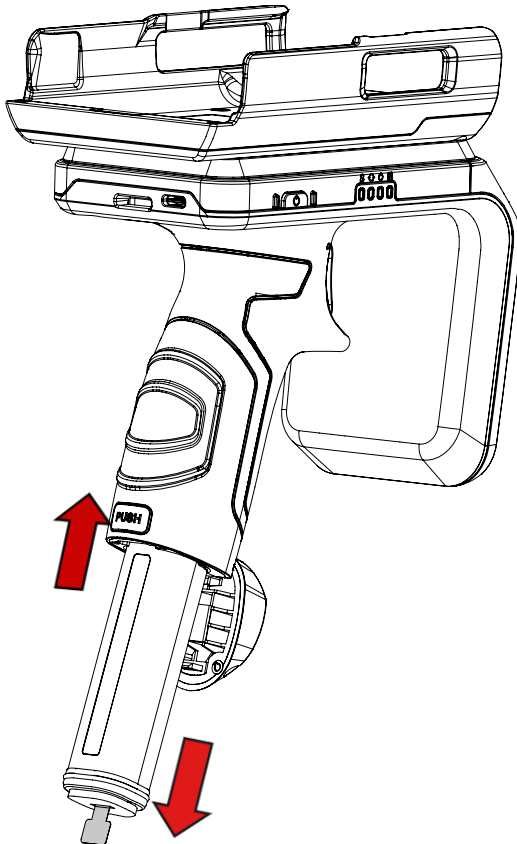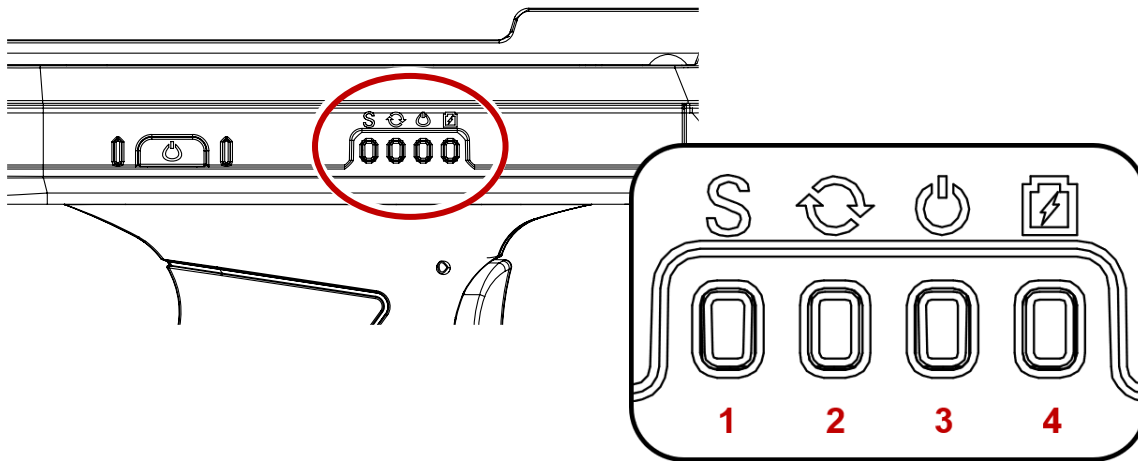| No	Indicator	Status	Indication
1	Trigger-Mode LED	⭕ Turned off	UHF RFID mode
		🔴 Solid red	Barcode scan mode
2	Connect-Mode LED	⭕ Turned off	Wired communication mode
		🔴 Solid red	Bluetooth communication mode
3	State LED	🔴 Solid red	Power on
		🟢 Solid green	Bluetooth or Wired connected
4	Charging LED	🔴 Solid red	Charging RF900
		🟢 Solid green	RF900 is fully charged
		🟢🔴 Alternately blinking green & red	Battery fault
		🔴 Blinking red	Low battery / Charging temperature is too high or low

ℹ️   *Note: When RF900 enters sleep mode, all LED indicators will turn off.*

Getting Started

Install PM90

Install PM90 onto the RF900. Regardless of the battery (standard or extended), the device can be installed.

1. Insert the PM90 into the retention fixture of RF900 from the left or right side first.
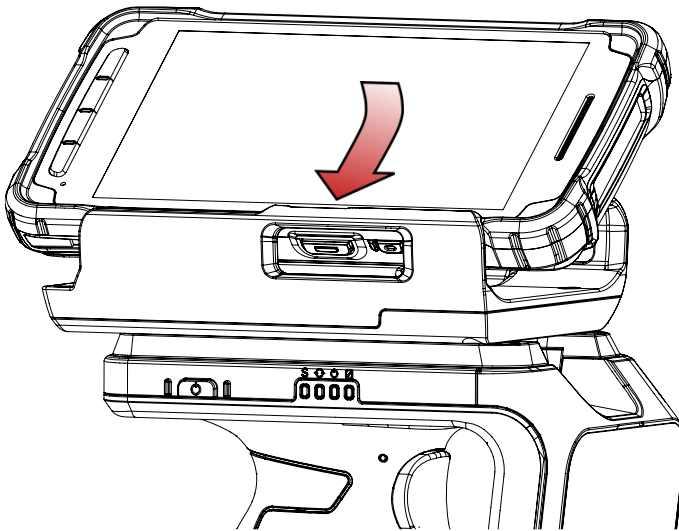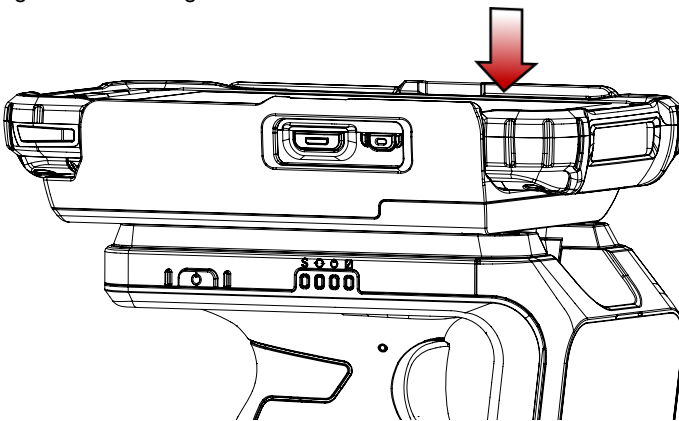
Figure 9 Installing PM90_1

2. Push the other side of PM90 down firmly.

Figure 10 Installing PM90_2

3. To remove, hold the RF900 and pull up one side of PM90.

Connecting PM90

Install the RFID Control App

Connect your PM90 and RF900, set up the configuration, and update the firmware of the RF900 using RFID Control application. The app can be downloaded from Point Mobile Service Portal website.

This guide only describes a few basic features of RFID Control, so please find more detail information in RFID Control User Guide.

To install RFID Control,

1. Access to Service Portal and log in.
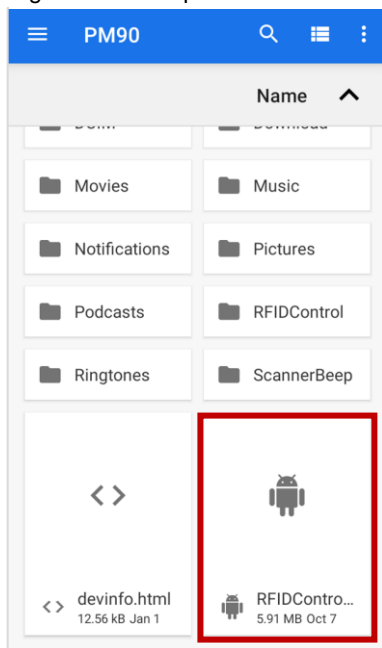2. Go to the **Download** board and find a post titled as **RFID Control Apps & Document**.
3. Download the RFID Control application.
4. Connect PM90 with PC and copy the apk file to internal storage of PM90.
5. Go to **FileExplorer** 🗒 from PM90 App drawer, and install the app.

Figure 11 FileExplorer

6. To run the app, tap **RFID Control** 📑 from App drawer or **EmKit** 🔴

Connecting PM90

Connect mode

RF900 supports two following connect modes.

Mode	Description
Wired communication (Default)	• Communicate through the pogo pin connectors on the PM90 and RF900. • Need to install PM90 on RF900.
Bluetooth communication	• Communicate through Bluetooth.

Change connect mode

To change connect mode from one to another,

- Press connect mode change button of RF900 until Connect-Mode LED changes.
- Change **Open option** in RFID Control.

Figure 12 Connect mode change button
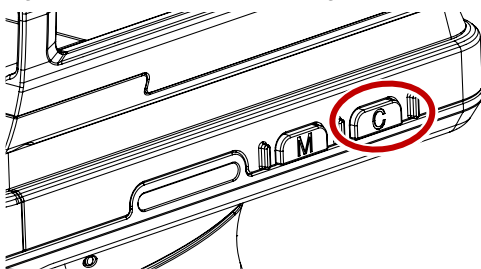
Figure 13 Connect-Mode LED
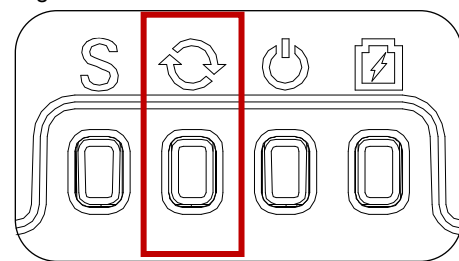
Connect-Mode LED	⃝ Turned off	Wired communication mode
	🔴 Solid red	Bluetooth communication mode

Figure 14 RFID Control - Open options
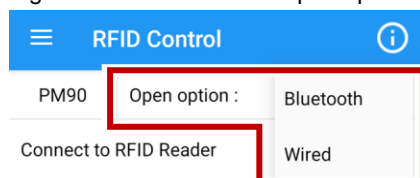
Note: Disconnect current connection before changing connect mode.
Connect mode change button does not work when RF900 is already connected to any PM90.

Connecting PM90

Wired Communication

Wired communication is a default connect mode for RF900 and PM90.

Because the devices communicate through pogo pin connectors, you must install PM90 on RF900 first for wired communication.

1. Install PM90 on RF900 referring to Install PM90.

2. Make sure the Connect-Mode LED is turned off. (= Wired mode)

3. Launch RFID Control and check if the **Open option** set as **Wired**.

4. Turn on **Connect to RFID Reader** toggle switch.

Figure 15 RFID Control - Wired mode
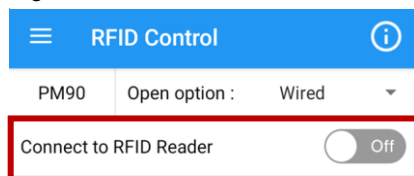
5. When the devices are connected properly,

   - State LED of RF900 lights green

   - An icon indicating the RF900's battery level is shown on the status bar

Figure 16 Wired connected screen

Figure 17 State LED (Wired or Bluetooth Connected)
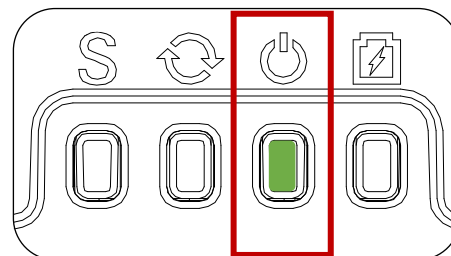
Connecting PM90

Disconnect

In one of the following cases, the wired communication will be disconnected.

- Detach PM90 from RF900
- Turn off the **Connect to RFID Reader** toggle switch (In RFID Control)
- Change **Open option** to **Bluetooth** (In RFID Control)
- PM90 enters suspend mode
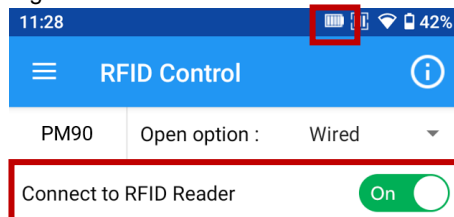- Turn off the RF900 or PM90

Auto reconnect

Auto-reconnect is performed when RF900 and PM90, connected through wired communication once, are re-installed, or PM90 wakes up from suspend mode while installed on RF900.

For auto-reconnect, all of the following states must be satisfied.

- RF900 and PM90 are turned on
- RF900 and PM90 connected through wired communication at least one time
- **Open option** of RFID Control and connect mode of RF900 is set as **Wired**
- Previous connection is disconnected by removing PM90 from RF900

    (If you disconnected it by toggle switch in RFID Control, Auto-reconnect does not perform.)

Connecting PM90

Bluetooth Communication

To connect RF900 and PM90 with Bluetooth, change the connect mode on the RF900 and RFID Control, first (Refer to Connect mode - Change connect mode).

When the **Open option** changes to Bluetooth while Bluetooth is turned off on PM90, the app tries to turn on the Bluetooth automatically. Tap **ALLOW**. If you denied, the app will be closed.

Figure 18 Bluetooth turn on dialog

RFID Control wants to turn on Bluetooth

DENY   ALLOW
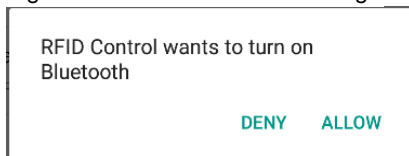
Connect methods

There are two ways to establish the Bluetooth communication, Tap-to-Pair and Searching RFID reader. Choose more comfortable way.

> **Note: NFC Tap-to-Pair or Search RFID reader**
> - **NFC Tap-to-Pair**: Easy automatic pairing and connection process with a single tap
> - **Search RFID reader**: Normal pairing and connection process with manual steps

Connecting PM90

Tap-to-Pair

Tap-to-Pair method uses NFC feature, and connect RF900 and PM90 just by getting them close. An NFC tag is on RF900 UHF RFID antenna to support Tap-to-Pair.

1. Change connect mode to Bluetooth on RF900

    and **Open option** of RFID Control to **Bluetooth**.

2. Tap **NFC Tap-to-Pair** on RFID Control.

> ℹ️ *Note: NFC is enabled by default. But if NFC is turned off, app will ask to turn on NFC. Tap **OK** and tap NFC toggle switch to enable NFC.*

Figure 19 NFC turn on dialog

NFC Tap-to-Pair

Please turn on NFC to connect with Tap-to-Pair

CANCEL   OK
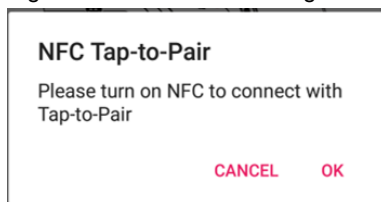
Or before access the Tap-to-Pair screen, enable NFC by one of below ways.

- ***Settings*** > ***Connected devices*** > ***Connection preferences*** > *NFC > enable switch*

- *Open Quick setting panel > enable **NFC***
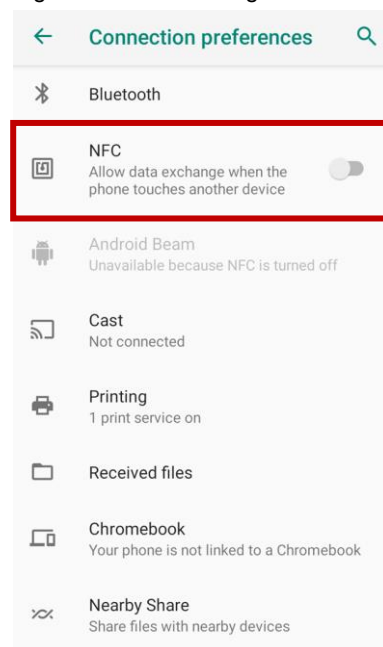
Figure 21 NFC_Settings

Figure 20 NFC_Quick setting panel
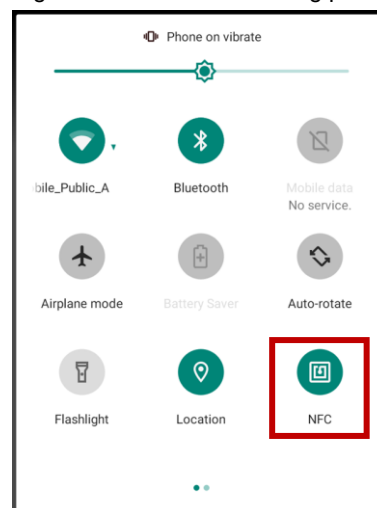
Connecting PM90

3. Referring to NFC antenna area of PM90, bring the PM90 close to the NFC logo of RF900 as the picture on the screen. And then, allow the connection in the dialogs.

Figure 23 RF900 NFC tag location

Figure 22 PM90 NFC tagging area
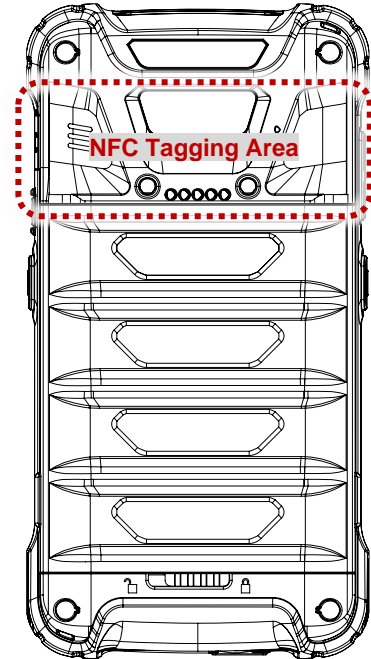
4. Check the device and reader are connected properly

    - Enabled **Connect to RFID Reader** toggle switch and connected RF900's name is displayed
    - An icon indicating the RF900's battery level is shown on the status bar
    - RF900's state LED lights green

Figure 24 Bluetooth connected screen
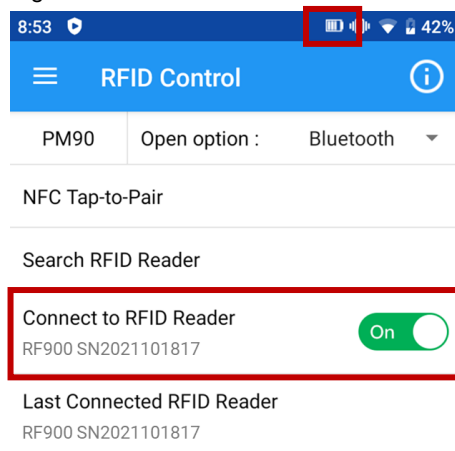
Figure 25 State LED (Wired or Bluetooth Connected)
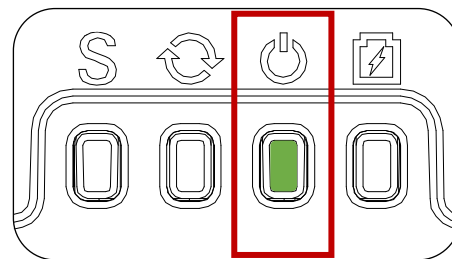
Connecting PM90

Search RFID Reader

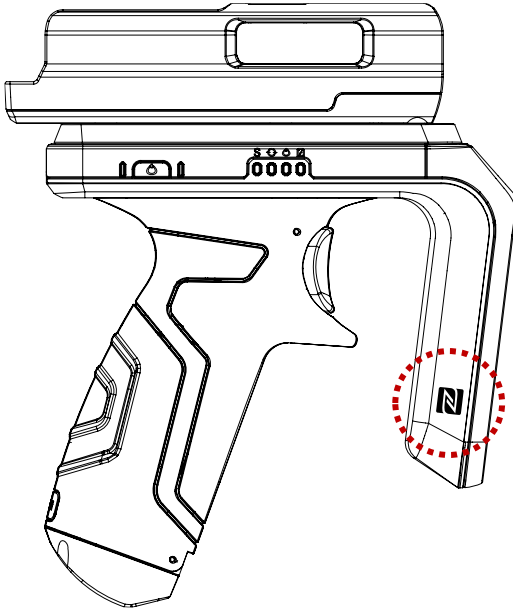Search nearby RF900 and choose one of the RF900.

1. Change connect mode to Bluetooth on RF900
   and **Open option** of RFID Control to **Bluetooth**.

2. Tap **Search RFID Reader** on RFID Control

Figure 26 Search RFID Reader
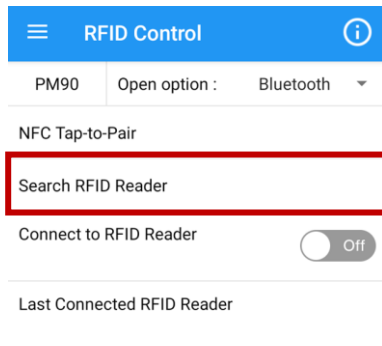
3. When desired RF900 name appears, stop searching by tapping **STOP** and select the name

Figure 27 Searching RFID reader
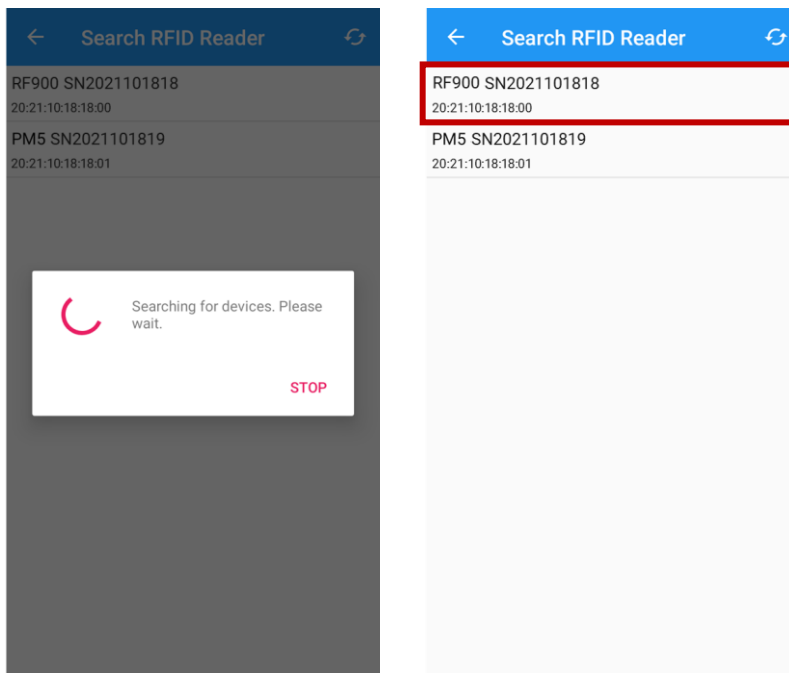
Connecting PM90

4. Allow the connection in the dialogs

Figure 28 Bluetooth pairing dialog

**Pair with RF900
SN2021101818?**

☐ Allow access to your contacts and call history

CANCEL   PAIR
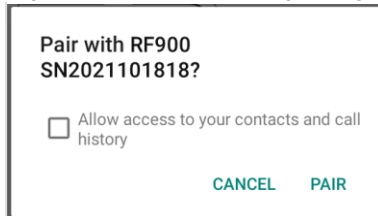
5. Check below items to confirm that RF900 is connected properly (Refer to Figure 24, Figure 25)

- Enabled **Connect to RFID Reader** toggle switch and connected RF900's name is displayed

- An icon indicating the RF900's battery level is shown on the status bar

- RF900's state LED lights green

Connecting PM90

Disconnect

In one of the following cases, the Bluetooth communication will be disconnected.

- Change **Open option** to **Wired** (In RFID Control app)
- Disable Bluetooth from PM90
- Turn off the **Connect to RFID Reader** toggle switch (In RFID Control app)
- Turn off the RF900 or PM90

Reconnect

To reconnect to the last connected RFID reader, tap **Connect to RFID Reader** toggle switch and wait until the devices are connected.

Figure 29 Reconnect toggle switch
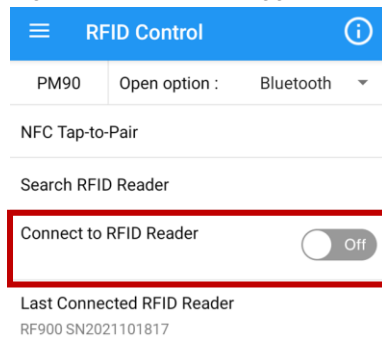
Configuration Settings

Configuration Detail

RF900 configuration contains below settings. Find the details of each setting from RFID Control User Guide.

Settings			Range or Options	Default Value
Beep Volume			Mute Low High	High
Vibrator			On / Off	Off
Radio Power			-30 ~ 0 (0 ~ 30 dBm)	0 (30 dBm)
Tx Cycle	**Tx ON duration**		40 ~ 400	200
	Tx OFF duration		0 ~ 255	0
Tx Data Format			TAG_DATA PREFIX_TAG_DATA TAG_DATA_SUFFIX PREFIX_TAG_DATA_SUFFIX	TAG_DATA
Data Format			PC_EPC_CRC PC_EPC EPC_CRC EPC_ONLY	PC_EPC_CRC
Filter duplicate tags			On / Off	Off
Filter (Filter 1, 2)	**Tag Pattern**			(Blank)
	Offset		0~62	0 (digit)
	Select		Matching tags Non-matching tags	Matching tags
	Enable filter		Enable / Disable	Disable
Inventory Config	**Inventory Param**	**Session**	0 / 1 / 2 / 3	1
		Q	0 ~ 15	5
		Flag	A / B / A or B	A
	Operation Mode	**Mode**	Continuous Mode Single Mode	Continuous Mode
		Timeout	0 ~ 120	0 (Infinite)

Configuration Settings

Settings		Range or Options	Default Value
Tag Focus		On / Off	On
Fast ID		On / Off	Off
Continuous Read		On / Off	On
Auto Read	**On / Off**	On / Off	Off
	Auto read interval	1 ~ 99	1 (sec)
Save Log		On / Off	Off
Save tag list to csv		On / Off	Off
Sleep		30 seconds 1 minute 5 minutes 10 minutes 30 minutes 1 hour 2 hours	10 minutes
Reset RFID Settings			

Configuration Settings

Apply Configuration

To adjust configuration, use RFID Control app or importing JSON file.

Apply via RFID Control

After connecting the devices, tap ☰ to open the side menu bar and select **Configuration**. And then, adjust each configuration manually using RFID Control interface.
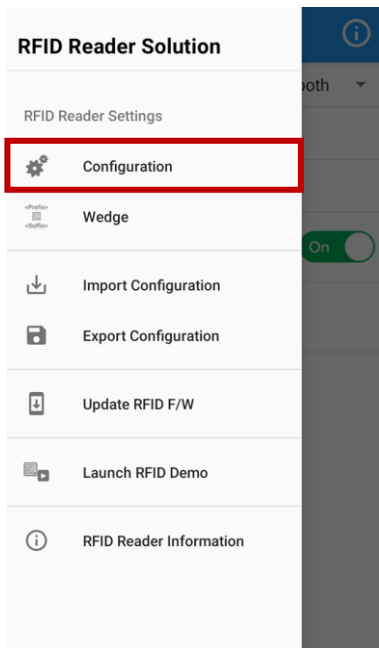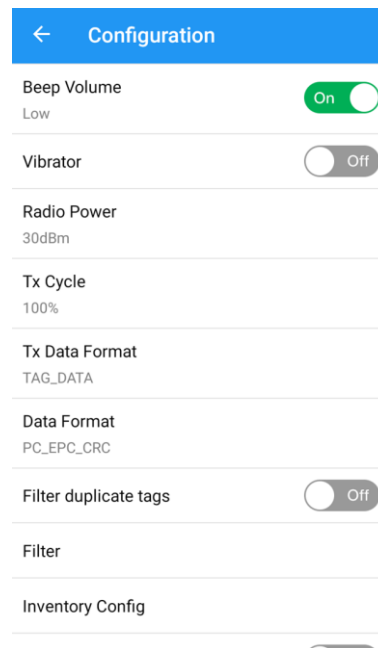
Figure 31 Side menu bar - Configuration

Figure 30 Configuration

Configuration Settings

Apply via JSON file

You can also apply the configuration by importing the JSON file which contains configuration.

The JSON file for configuration update can be made by RFID Control Configuration Tool. And it must be named as **Configuration.json** and copied into **RFIDControl/RFIDJsons** folder of host device's internal storage.

> ⓘ *Note: Must follow the file name and path. Otherwise, RFID Control cannot find the file.*

You can perform configuration update automatically or manually. Refer to below table to identify the differences and choose more suitable on your working environments.

Methods	Description
Auto Update	• Set auto update settings in JSON file • Update configuration every time the RF900 is connected while RFID Control is running
Manual Update	• Perform regardless the auto update is enabled or disabled • Perform update immediately

Auto Update

To set up the auto update, enable and save the auto update setting (**Auto update (JSON)**) in **Configuration.json** file which contains the configurations. (Find more detail in RFID Control Configuration Tool User Guide.)

And then, launch RFID Control without any connection with RF900 to save the auto update setting on the app.

When you set up Auto update,

- Auto Update will be performed every time RF900 is connected while RFID Control is running
- Auto Update setting value will be maintained until next reading JSON file
  - JSON file is read when RFID Control is launched without any connection with RF900

Configuration Settings

Manual Update

Manual update can be performed regardless the auto update is enabled or disabled. To apply the configuration immediately, perform update manually.

1. Make **Configuration.json** file and copy it to specified folder in internal storage of host device

2. Tap ☰ to open the side menu bar and select **Import Configuration**.

3. Tap **IMPORT** and wait until the process is done

   (There is no need to select JSON file because app will automatically find and use the

   Configuration.json file in the **RFIDControl/RFIDJsons** folder)

Figure 32 RFID Control - Import Configuration
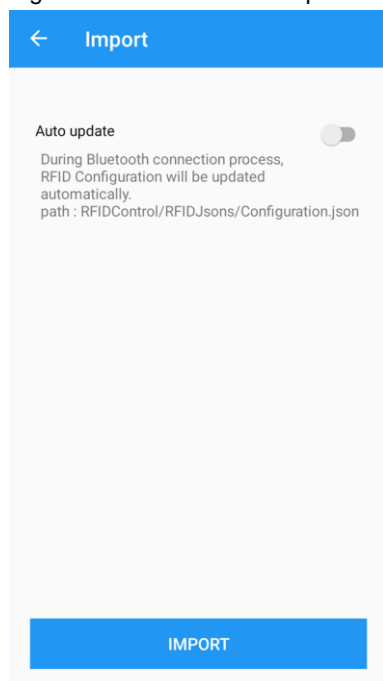
Wedge Settings

Wedge Detail

Wedge contains the below values. Find the details of each setting from [RFID Control User Guide](#).

Settings	Options	Default Value
Result Type	Callback (User Message) Keyboard Event Clipboard (KEYCODE_PASTE) Clipboard (Ctrl+V) Intent Broadcast Custom Intent	Clipboard (KEYCODE_PASTE)
Terminator	None Space Tab LF Tab & LF	None
Prefix		(Blank)
Suffix		(Blank)

> **Note**: *Prefix and Suffix will be added to the tag data when Configuration – Tx Data Format is set to the option including Prefix or Suffix.*

Wedge Settings

Apply Wedge

To adjust wedge setting, use RFID Control app or importing JSON file.

Apply via RFID Control

After connecting the devices, you can access **Wedge**. Tap ☰ to open the side menu bar and select **Wedge**. And then, adjust desired configuration.
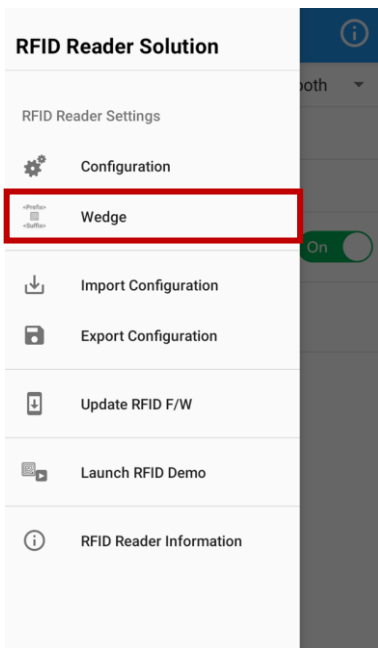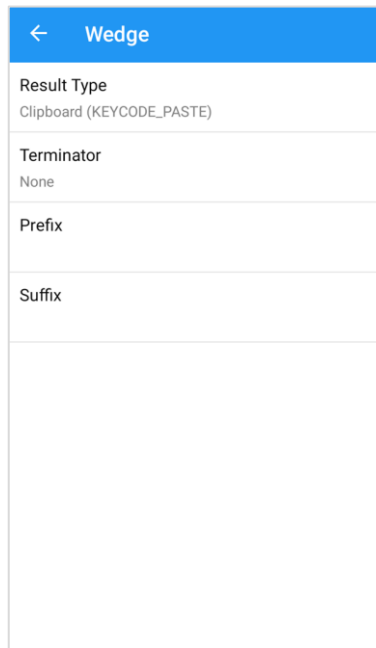
Figure 34 Side menu bar - Wedge

Figure 33 RFID Control - Wedge

Apply via JSON file

See Apply via JSON file in Configuration Settings. If the JSON file contains wedge setting values, Wedge settings are applied at the same time when you apply the configuration settings via the JSON file.

Firmware Update

Point Mobile provides up-to-date RF900 firmware in Service Portal. The firmware files are provided by RFU file format, and it contains Bluetooth firmware and MCU firmware both.

To perform firmware update, download the RFU file from Service Portal and copy it into the specified folder of host device's internal storage.

> **i** **Note:** *Must copy the RFU file to **RFIDControl/RFIDRFUs** folder of host device's internal storage. Otherwise, the app cannot find the file.*

You can perform update automatically or manually. Refer to below table to identify the differences and choose more suitable on your working environments.

Methods	Description
Auto Update	• Set auto update settings and firmware filename in JSON file • Update Firmware every time the RF900 is connected via Bluetooth while RFID Control is running
Manual Update	• Select firmware file manually in RFID Control • Perform update immediately

> **i** **Note:** *RF900 must be connected via Bluetooth for firmware update.*

Auto Update

To set up the auto update, enable and save the auto update setting (**Auto update (RFU)** & **RFU filename**) in **Configuration.json** file (Find how to set auto update in JSON file in RFID Control Configuration Tool User Guide) and copy the JSON file into **RFIDControl/RFIDJsons** folder of host device.

And then, launch RFID Control without any connection with RF900 to save the auto update setting on the app.

When you set up Auto Update,

- Auto Update will be performed…
    - Every time the RF900 is connected via Bluetooth while RFID Control is running
      & RFU file version is different from current RF900 firmware version
- Auto Update setting value will be maintained until next reading JSON file
    - JSON file is read when RFID Control is launched without any connection with RF900

Firmware Update

Manual Update

Manual update can be performed regardless the auto update is enabled or disabled. To update the firmware of RF900 manually,

1. Execute RFID Control and connect RF900 via Bluetooth to host device

2. Tap ☰ and select **Update RFID F/W**

3. Tap [...] to browse the RFU file you prepared

   (The file must be in **RFIDControl/RFIDRFUs** folder.)

Figure 35 RFID Control – Update RFID F/W
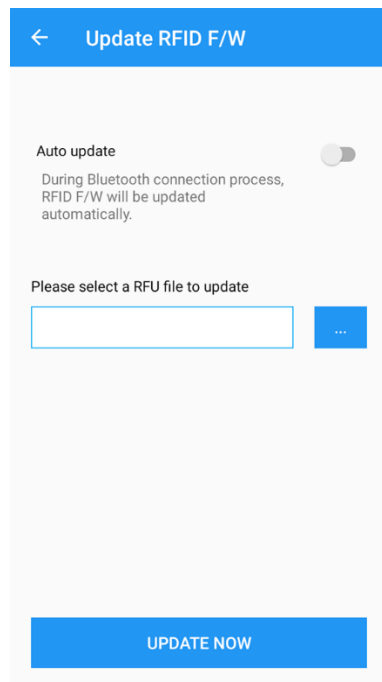
4. Select the RFU file and Tap **UPDATE NOW**
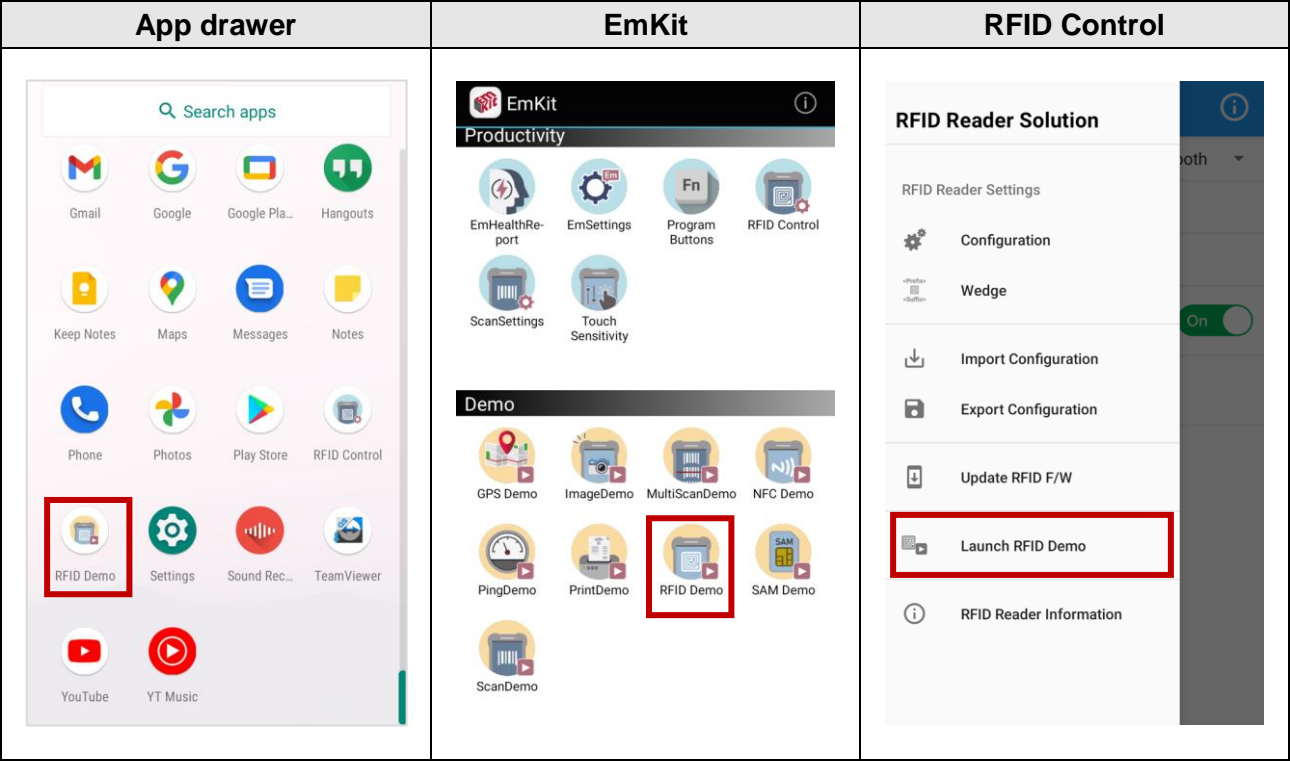
5. Wait until the update process is done

Read RFID Tag

RFID Demo

You can demonstrate the function of reading an RFID tag with RFID Demo. RFID Demo will be installed together with RFID Control.

There are two ways to launch RFID Demo,

- Tap **RFID Demo** from App drawer or **EmKit**

- Open the side menu bar on the RFID Control and tap **Launch RFID Demo**

App drawer	EmKit	RFID Control

Read RFID Tag

Read the RFID Tag

Before read RFID tag, make sure that the Trigger-Mode LED lights off. Turned off Trigger-Mode LED means that RF900 is in UHF RFID mode.
If the LED lights on red, press and hold the Trigger-mode change button until the LED turns off because red LED means RF900 is in barcode scan mode.
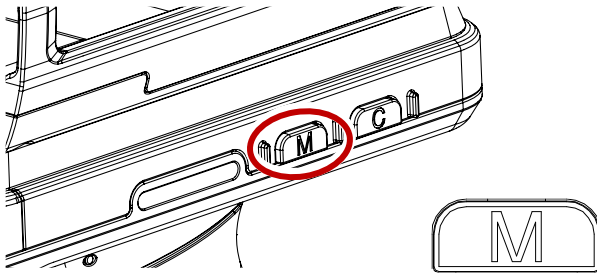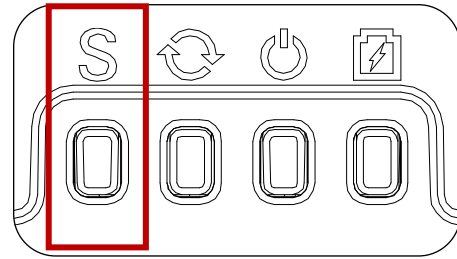
Figure 36 Trigger mode change button

Figure 37 Trigger-Mode LED (UHF RFID mode)

Read RFID tags after connecting the RF900 to your PM90. To read RFID tags, aim the tag and then press the trigger button of RF900 or tap the **Read RFID Tag** button on the screen.
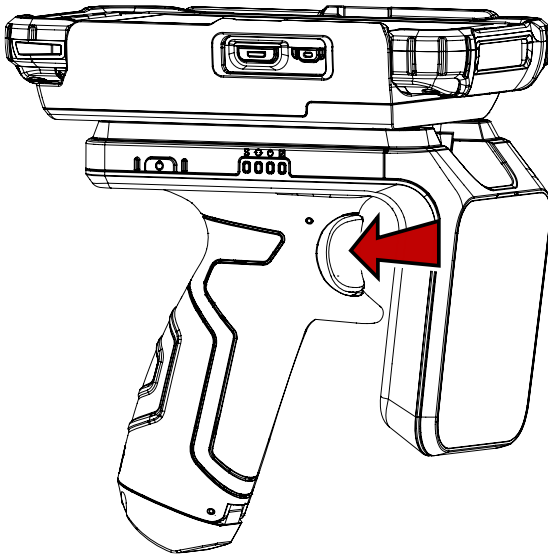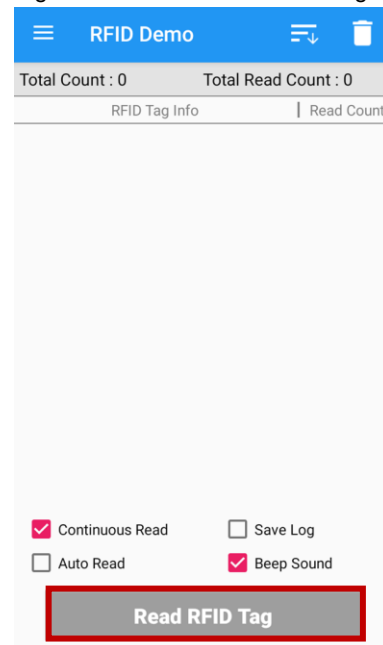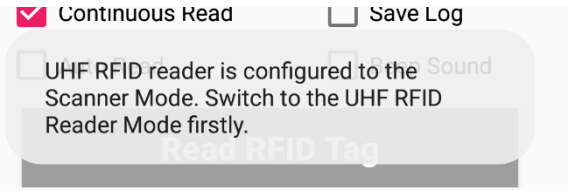
Figure 39 Reading RFID tag

Figure 38 RFID Demo - Read tag

Read RFID Tag

Note: *Make sure the RF900 is in UHF RFID mode. If you try to read RFID tags using RFID Demo app while RF900 is in **barcode scan mode**, it does not work and a toast message pops up on the screen.*
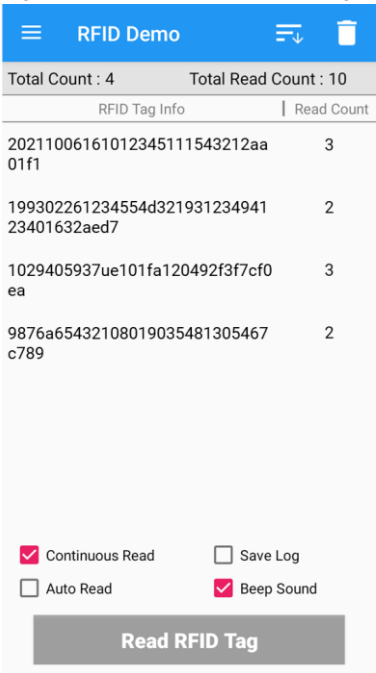
Figure 40 RFID Demo - Barcode scan mode message

For demonstrating barcode scan function, use Scan Demo application.

Tap ⇅ to sort the delivered tag data in order and tap 🗑 to clear the tag data.

Figure 41 RFID Demo - Read tags

Scan a Barcode

If you want to scan a barcode instead of RFID tag, change the trigger mode of RF900. Trigger button will activate the barcode scan action.

1. Press and hold the trigger mode change button until the Trigger-Mode LED turn on red.

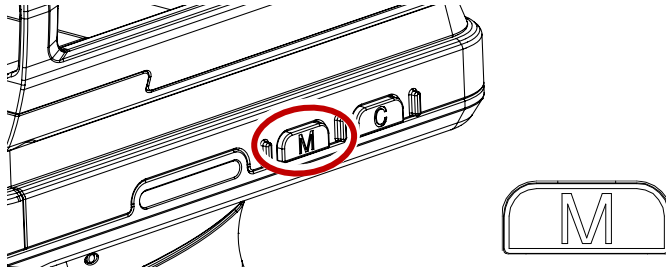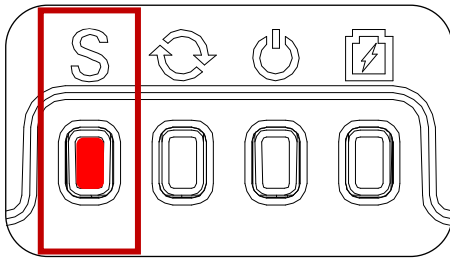Figure 42 Trigger mode change button

Figure 43 Trigger-Mode LED (Barcode scan mode)

2. Execute **Scan Demo** or scanner application, and then scan a barcode by pressing the trigger button of RF900.

3. Check the barcode information displayed on the app.

Accessory

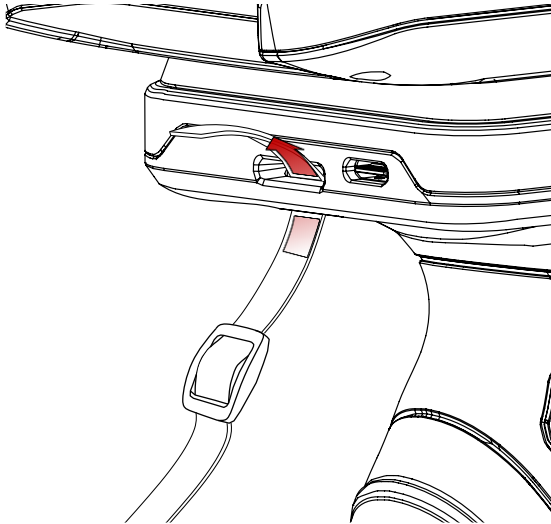A hand strap is enclosed in the RF900 package. Attach the strap and carry the reader more comfortably.

Figure 44 Hand strap
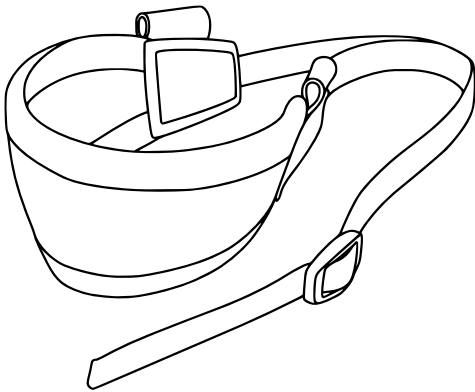
To attach the hand strap,

1. Thread the strap through the hand strap hole next to the USB connector.
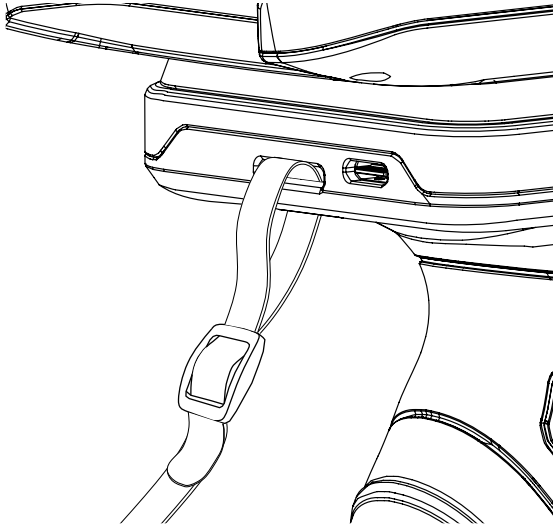
Figure 45 Attach hand strap_1

Accessory

2. Slide the strap through the buckle at the appropriate length.

Figure 46 Attach hand strap_2

Safety Information

Battery Safety Information

Follow battery safety guidelines in this manual for safe usage and disposal of Li-ion batteries. Improper battery usage may result in an explosion, fire, or other critical hazards.

Battery Usage & Disposal Guidelines

1. Use only Point Mobile approved batteries and charging accessories. Other batteries and charger may damage the device.
2. Do not disassemble or modify the battery. Do not bend, shred, deform the battery.
3. Do not expose the battery to excessive heat or cold. Do not place the battery into a microwave oven or dryer.
4. Do not short-circuit the battery or allow a foreign object to battery contacts.
5. Do not burn, expose to water, or other liquids the battery.
6. If battery leakage is observed, avoid any contact with the skin or eyes. If contact has been made, wash the affected area with water for 15 minutes, and seek medical attention.
7. Follow the local regulations for the disposal of used batteries.
8. Do not store or charge the battery in direct sunlight or in areas prone to get hot such as in a parked vehicle, near a heat duct, or close to other heat sources.

Battery Charging Guidelines

1. Do not charge the battery in or near areas with materials that could obstruct charging or cause a short-circuit.
2. Do not charge the battery in the excessive hot or cold area.
3. Separate the charger from the battery as soon as possible when the battery is fully charged.

Safety Information

Battery Storage Guidelines

Storing the batteries is as important as using it safely. Battery is a core part of the device's performance so that you should treat the batteries safely.

1. Batteries should be stored in the clean, dry and ventilated environment within ambient temperature ranges of 20±5 ℃

2. Keep batteries away from corrosive substances.

3. Keep batteries away from fire and heat.

4. Batteries are charged while producing to below 20 ~ 30 % of full capacity for safety regulations.

5. Charge it for 30 minutes –1hour t least once every six months to prevent full discharge and keep the performance, when you are not using the battery for a long period.

> 📢 ***Notice:*** *The battery is consumable goods. Point Mobile provides warranty for battery in 6 months after purchase.*
> *If you suspect the battery swelling, change the battery and contact Point Mobile to use safely.*

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