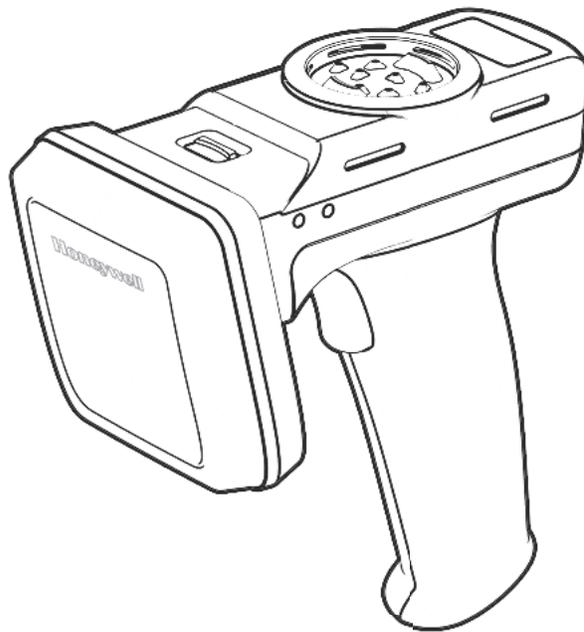


IH21

Bluetooth[®] UHF RFID Reader



User Guide

Disclaimer

Honeywell International Inc. ("HII") reserves the right to make changes in specifications and other information contained in this document without prior notice, and the reader should in all cases consult HII to determine whether any such changes have been made. The information in this publication does not represent a commitment on the part of HII.

HII shall not be liable for technical or editorial errors or omissions contained herein; nor for incidental or consequential damages resulting from the furnishing, performance, or use of this material. HII disclaims all responsibility for the selection and use of software and/or hardware to achieve intended results.

This document contains proprietary information that is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced, or translated into another language without the prior written consent of HII.

Copyright © 2018 Honeywell International Inc. All rights reserved.

Web Address: www.honeywellaidc.com

ePop-Loq®, TSL ASCII, and logos are registered trademarks owned by Technology Solutions (UK) Ltd (TSL®.)

Other product names or marks mentioned in this document may be trademarks or registered trademarks of other companies and are the property of their respective owners.

For patent information, refer to www.hsmpats.com.

TABLE OF CONTENTS

Customer Support	iii
Technical Assistance	iii
Product Service and Repair	iii
Limited Warranty	iii
Send Feedback	iii
Chapter 1 - Introduction	1
IH21 Features	1
Battery Installation or Removal.....	2
Charging	3
UHF Antenna Installation or Removal.....	4
Locking the Antenna	5
ePop-Loq®	5
Components	5
Installation	6
Removal.....	6
Button Operation.....	7
Reading Transponders	7
LED Status	8
MicroSD Card.....	9
Install a MircoSD Card.....	9
Remove a MicroSD Card	10
Auto Run File (AUTO.TXT).....	10
Log File (LOG.TXT)	11
Software Development.....	11

Chapter 2 - Connections 13

- Connecting with USB 13
 - Overview..... 13
 - USB Operating Modes..... 13
 - Changing the USB Operating Mode..... 13
- Connecting with Bluetooth® Wireless Technology 14
 - Comparison of Bluetooth Operating Modes 14
 - Change the Bluetooth Operating Modes 15

Chapter 3 - Maintenance And Troubleshooting 17

- Maintenance..... 17
- Troubleshooting 17

Customer Support

Technical Assistance

To search our knowledge base for a solution or to log in to the Technical Support portal and report a problem, go to www.hsmcontactsupport.com.

For our latest contact information, see www.honeywellaidc.com/locations.

Product Service and Repair

Honeywell International Inc. provides service for all of its products through service centers throughout the world. To obtain warranty or non-warranty service, return your product to Honeywell (postage paid) with a copy of the dated purchase record. To learn more, go to www.honeywellaidc.com and select **Service & Repair** at the bottom of the page.

Limited Warranty

For warranty information, go to www.honeywellaidc.com and click **Get Resources > Product Warranty**.

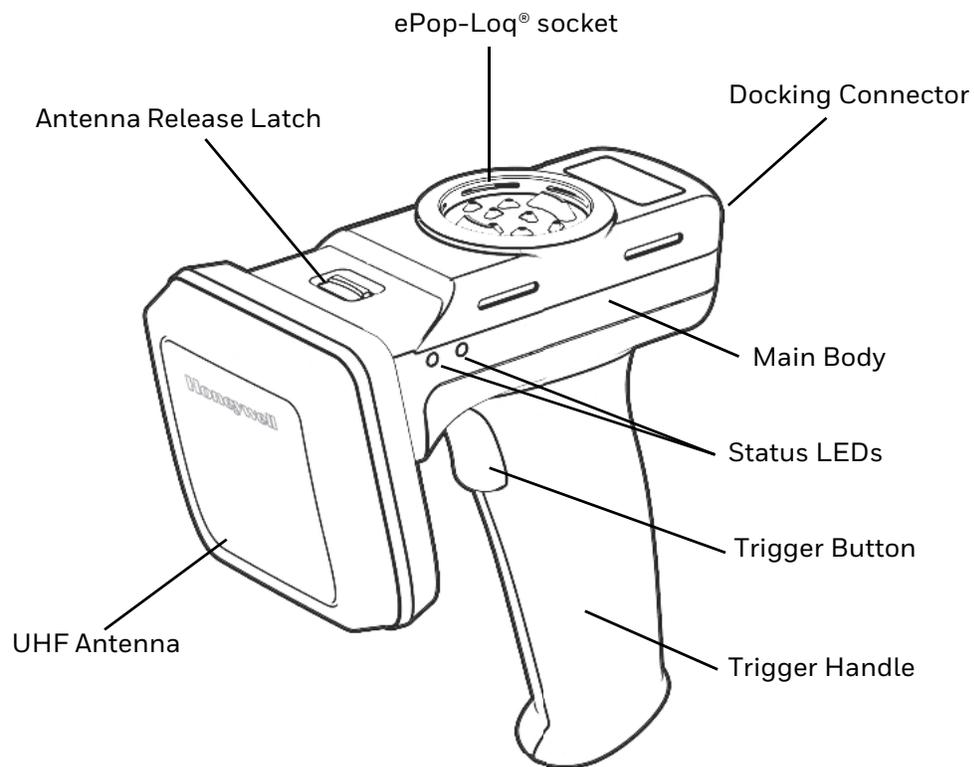
Send Feedback

Your feedback is crucial to the continual improvement of our documentation. To provide feedback about this manual, contact the Honeywell Technical Communications department at ACSHSMTechnicalCommunications@honeywell.com.

INTRODUCTION

Honeywell's IH21 UHF Reader provides Ultra High Frequency (UHF) Radio Frequency Identification (RFID). The reader can be used stand alone or paired with a Honeywell Mobility Computer. It can be used with UHF transponders including the EPC Global Class 1 Generation 2 transponders.

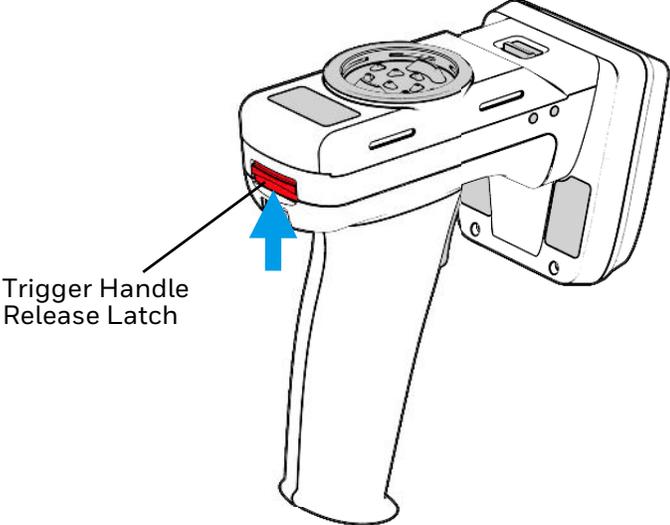
IH21 Features



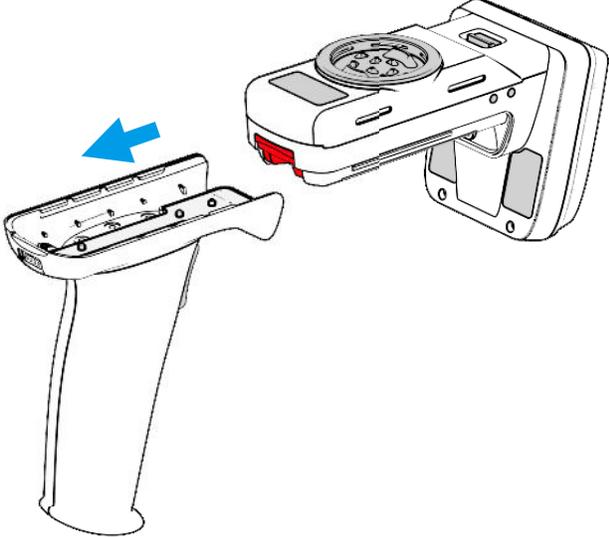
Battery Installation or Removal

The battery is charged using a docking station and therefore is unlikely to need to be changed once installed.

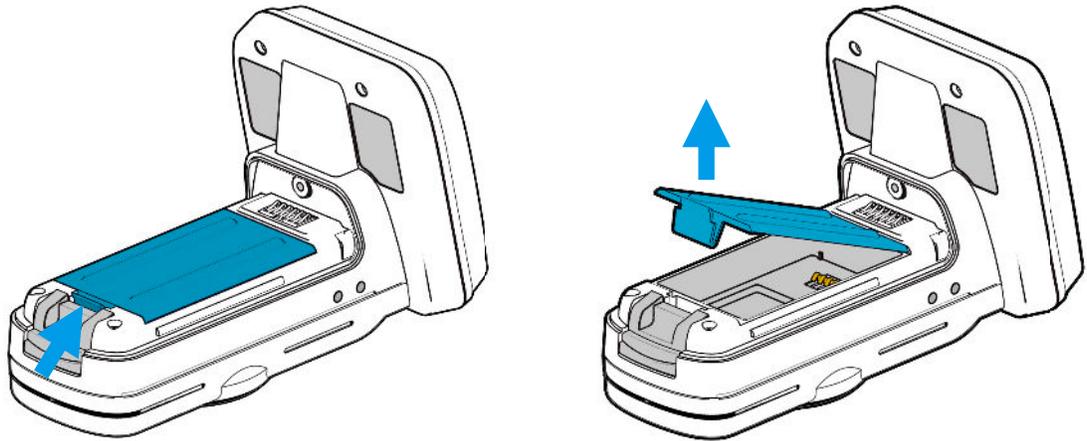
1. Push release latch up on the reader's trigger handle.



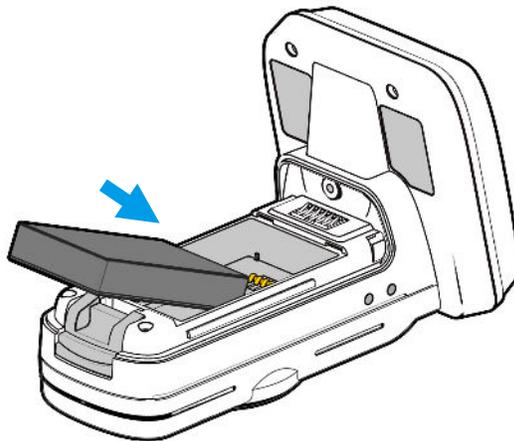
2. Slide handle back.



3. Remove battery cover. Push battery cover toward the UHF Antenna, and then lift battery cover up.



4. Insert the top end of the battery into the reader, and press battery down.

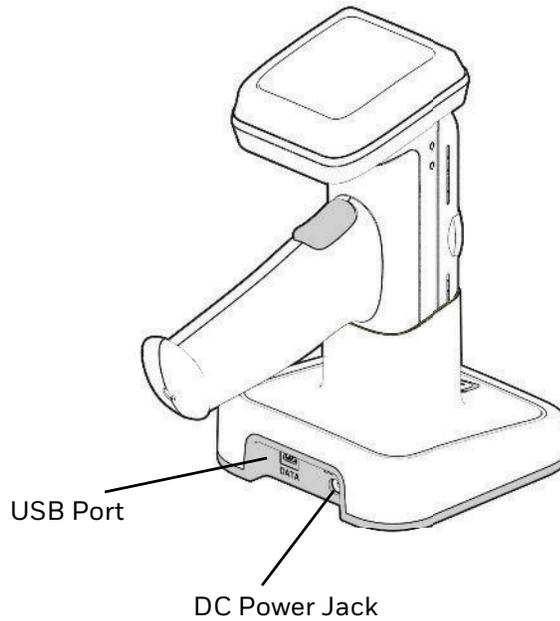


5. Attach the battery cover. Make sure that the cover clicks into place.
6. Attach the handle. Make sure that the handle clicks into place.

Charging

To comply with international shipping regulations, the battery is discharged to less than 30% of their maximum capacity. It is therefore recommended that you fully charge the battery before using the reader for the first time.

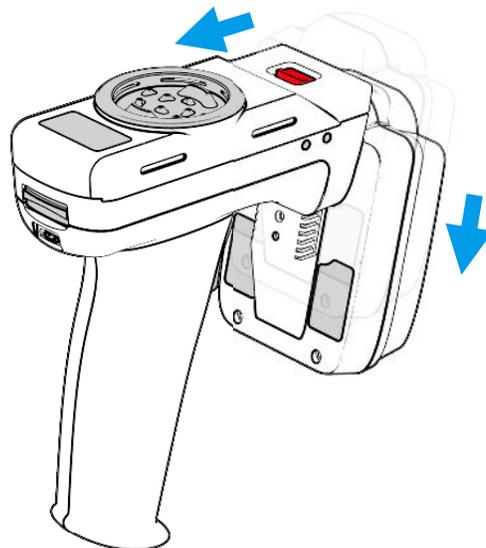
The reader can be charged using the dedicated IH21 docking station. The docking station has inputs for power and mini USB.



UHF Antenna Installation or Removal

The UHF antenna can be detached from the main body of the reader.

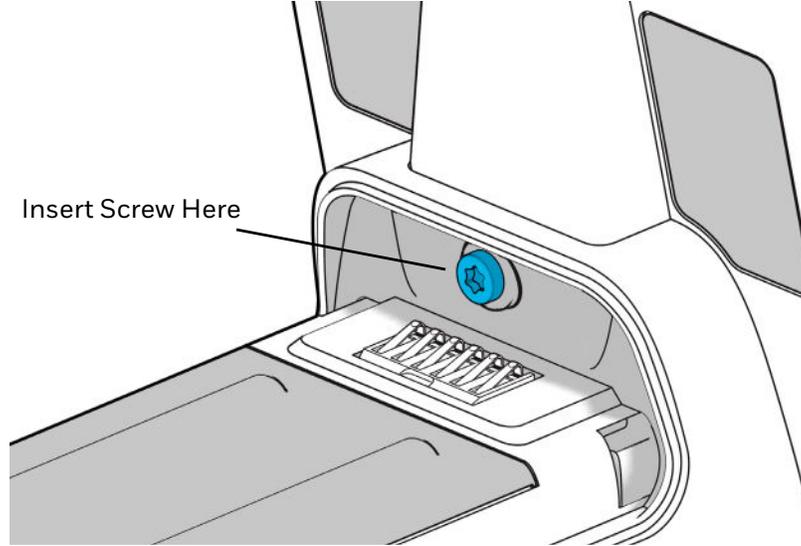
1. Remove the Honeywell mobility device from the reader.
2. Turn off power to the reader.
3. At the same time, press the antenna release latch back and pull the antenna downward.



Locking the Antenna

The antenna can be locked into position.

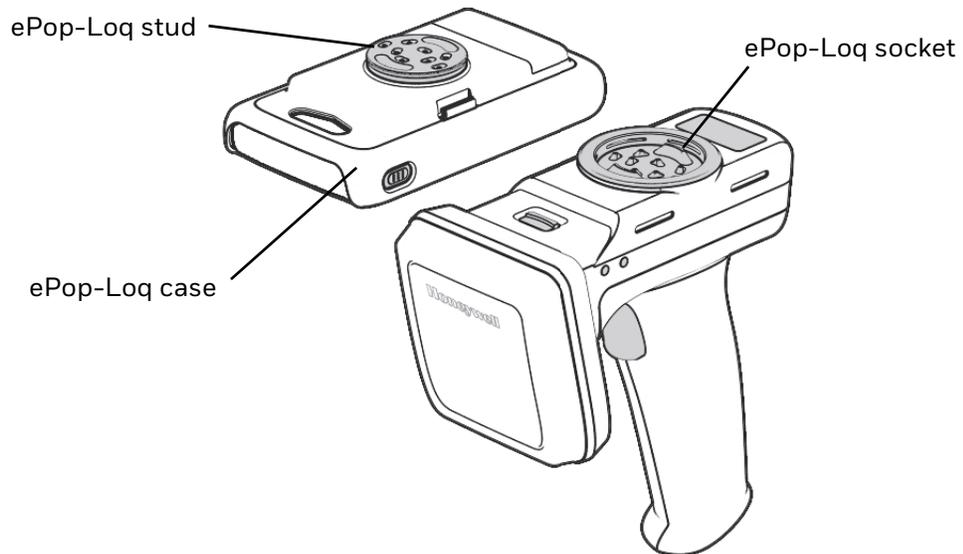
1. Remove the reader's trigger handle.
2. Insert a M2.5x5mm Torx pan head screw into the handle and antenna.



3. Attach the handle.

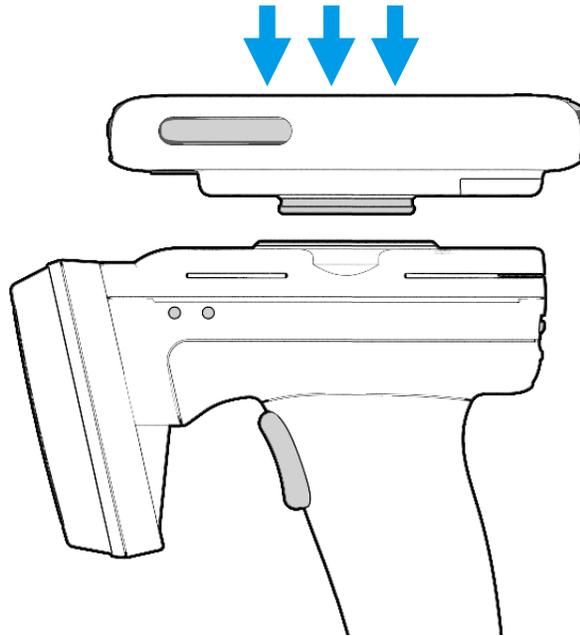
ePop-Loq[®]

Components



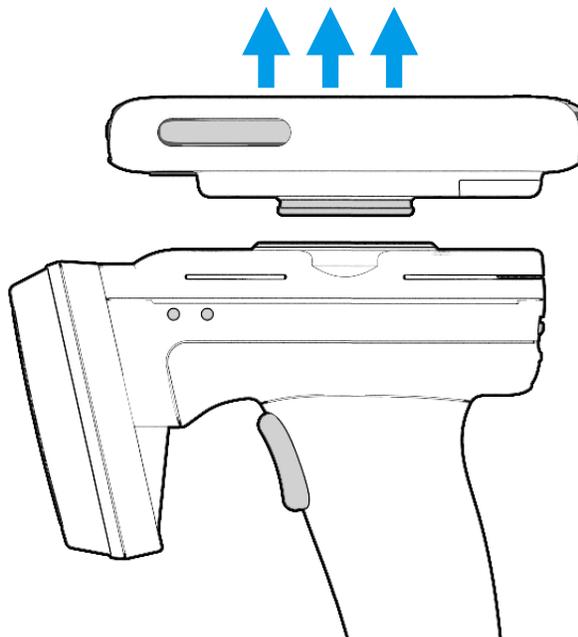
Installation

1. Ensure the mobility computer is fitted into the ePop-Loq case.
2. Check the socket and stud are clean and free from dirt or debris.
3. Align the stud with the socket, ensuring that it is parallel, and press the two parts together firmly until they click into place.



Removal

Pull the case parallel away from the reader. Do not twist devices when separating.



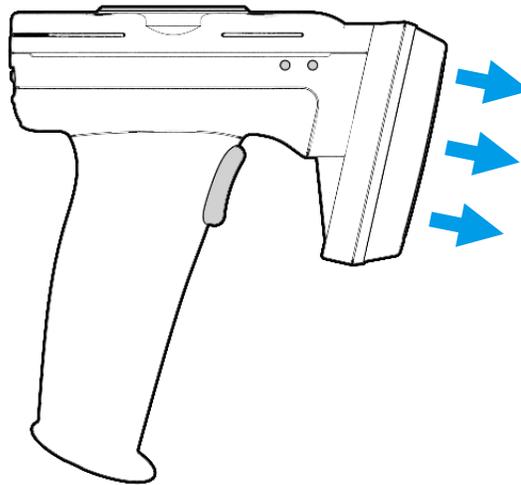
Button Operation

The default configuration of the reader scans for UHF transponders as the primary function. The reader will continue to scan for UHF transponders while the button is pressed. It will stop scanning once the button is released (and the current operation completes.)

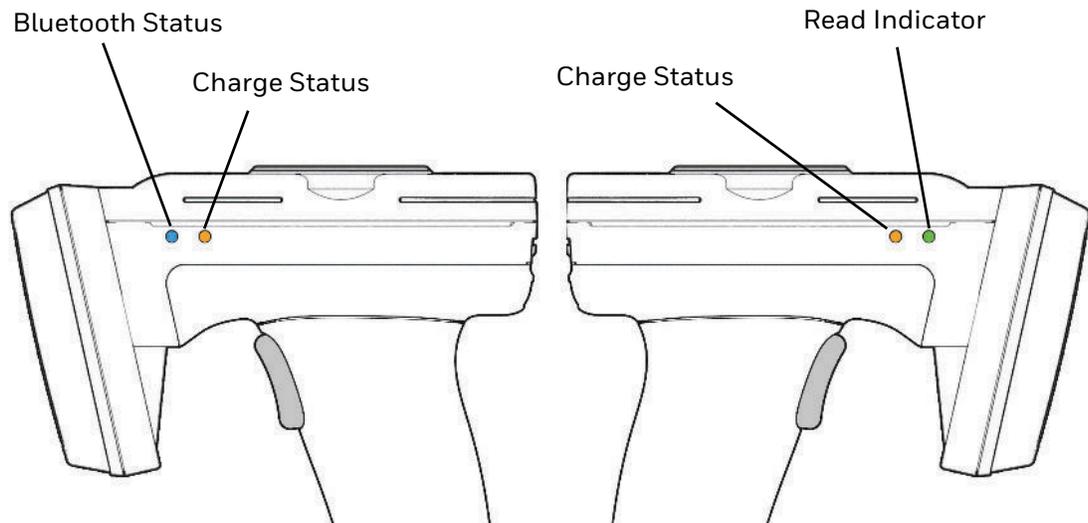
- To initiate, press and hold the trigger button.
- To terminate, release the trigger button.

Reading Transponders

RFID transponders can be read when they are in range of the antenna. The antenna is located on the front of the reader. The range at which a transponder can be read depends on the transponder type and size and the number of transponders in the field.



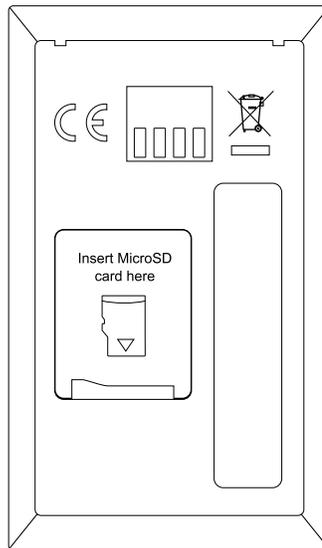
LED Status



LED	Status
Blue slow flash (50% on, 50% off)	The reader is awake, but there is no connection.
Blue constant	The reader is awake and connected to a host.
Short green flash	The reader has successfully read a tag, barcode, or executed the alert command.
Green slow flash (50% on, 50% off)	Antenna error.
Orange slow flash (50% on, 50% off)	Battery low warning (<10% capacity remaining.) Recharge immediately.
Orange short single slow flash	Battery charging with battery level less than 33%.
Orange short double flash	Battery charging with battery level less than or equal to 66%.
Orange short triple flash	Battery charging with battery level greater than or equal to 66%.
Orange rapid flash	There is a charge error/battery fault.
Orange constant	The reader is fully charged.
All off	The reader is off and not charging.

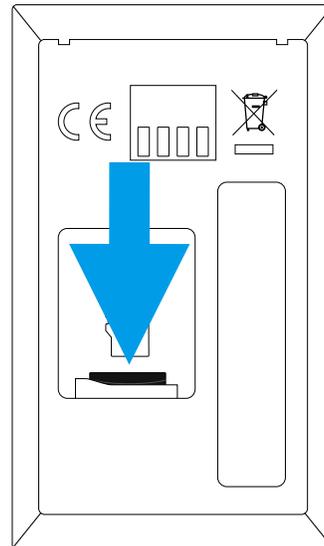
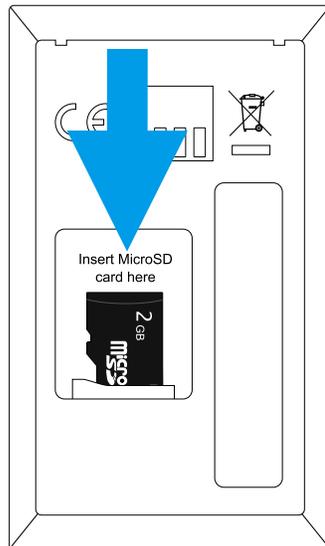
MicroSD Card

A microSD card can be installed in the reader. The card should be SD/SDHC compatible, FAT16 or FAT32, and up to 32 GB.



Install a MicroSD Card

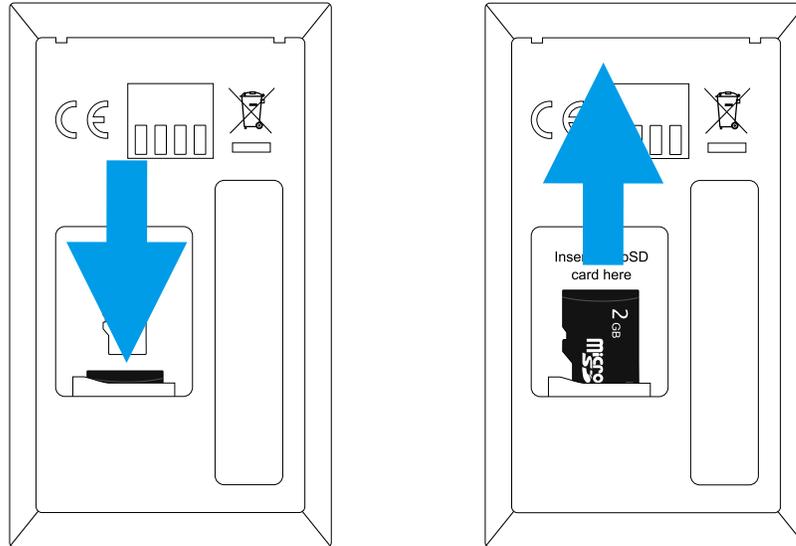
1. Remove the trigger handle.
2. Remove the battery cover and battery.
3. Slide the microSD card into the marked slot, and then push and release the microSD card to lock it into place.



4. Install the battery.
5. Attach the handle.

Remove a MicroSD Card

1. Remove the trigger handle.
2. Remove the battery cover and battery.
3. Push and release the microSD card. The card will eject and can be removed.



Auto Run File (AUTO.TXT)

Once a SD card is installed, an Auto Run file can be created on the SD card. The Auto Run file contains a list of ASCII commands that are executed as the reader powers up. The file should be located at the root of the card and called "AUTO.TXT." Although the file can contain any valid ASCII 2 commands, one per line, it is intended that these have the take no action '-x' flag specified to allow the default parameters for any command to be changed from the firmware defaults as the unit boots without actually executing the command.

Example: To change the carrier power of the inventory command from 29dBm to 20dm 'iv -o20 -x' would be appended to the Auto Run file. As the behavior with command parameters this will set the output power for the inventory command until a new value is send with this command. Therefore, the inventories executed by the trigger, which executes 'iv' will use the modified output power.

The Auto Run file can be manually created on the card before it is inserted into the reader or the ASCII 2 command Write Command to Auto Run File 'wa' can be used. The Read Auto Run File 'ra' can be used to read back the contents of the Auto Run file or delete the file from the card.

Log File (LOG.TXT)

Once a SD card is installed and logging is enabled a log file is created on the SD card. The file is located at the root of the card and called "LOG.TXT." All the lines from every response to every command that is executed by the reader (including those performed from trigger actions) are appended to the end of the file. Events such as Power Up are also appended to the file.

The ASCII 2 Read Log File command (".rl") is provided to enable or disable logging, to read the log file from the card or to delete the log file from the card.

Note: *The log file can quickly become large relative to the speed at which it can be downloaded using the Read Log File Command.*

Start of a sample log output:

```
DT: 2013-11-15t16:46:58
EV: Log File created
CS: .ws -sa4 -sbepc -ds300833B2DDD9014000000000 -s106 -so0002 -
sts2 -dbepc -da330DE29525C0210005F5F88A -d106 -do002
WW: 0
ME: No Transponder Found
ER: 005
DT: 2013-11-15T17:58:28
EV: Disconnected
DT: 2013-11-15T17:59:28
EV: Sleep
DT: 2013-11-18T09:18:21
EV: Wake up
CS: .al -dlon
OK:
DT: 2013-11-18T09:19:22
EV: Sleep
DT: 2013-11-18T10:07:42
EV: Wake up
DT: 2013-11-18T10:07:42
EV: Connected USB
CS: .al -dlon
OK:
CS: .iv LCMD 000000-qss0 -qta
EP: 330DE29525C0210005F5F8F2
EP: 22100150000000000000000027
OK:
```

Software Development

To make full use of the functionality of the reader, a customized software application will be required.

The reader incorporates TSL's unique ASCII protocol for faster and easier application development. This sophisticated parameterized ASCII protocol provides the developer a powerful set of commands that carry out multiple actions locally within the Bluetooth reader. This approach enables multiple tag operation executed using simple pre-configured ASCII commands while not only speeds integration of the reader into applications, but also abstracts the developer from some of the complexities of the underlying Native API. Simple, text based commands are sent to the reader and responses are returned as text. This allows straightforward access to RFID tag functions such as inventory, read, and write.

Connecting with USB

Overview

The IH21 UHF Reader has an ePop-Loq[®] mount which allows compatible devices with custom applications to communicate with the reader via USB instead of *Bluetooth*[®].

- USB connection will be passed through ePop-Loq to the attached device (via the ePop-Loq case.)
- USB connection to the reader requires a custom application that supports the ASCII protocol over USB.
- If the reader is placed into the charge cradle with an attached ePop-Loq mobility device, the USB will be disconnected, and both the IH21 and the device will charge.

USB Operating Modes

The ePop-Loq on the reader may operate in two modes. Charge-Only or Charge-and-Data:

- Charge-Only: The mobility device mounted will charge when the reader is placed in the charging cradle, but will never use the USB data connection
- Charge-and-Data: The mobility device will use the USB data connection when not in the charging cradle.

Note: *The USB connector on the charging cradle is always available when the reader is docked.*

Changing the USB Operating Mode

The factory default mode is Charge-Only.

The USB operating mode maybe changed by adding commands to an AUTO.TXT file placed in the root directory of the microSD card in the reader.

Note: *The ePop-Loq USB mode is non-volatile and the command may be safely removed from the AUTO.TXT file after it has been run once.*

Set USB mode to Charge-Only

1. Create a blank AUTO.TXT file.
2. Add the following command (without quotations): “.fd -ep co”.
3. Place the file within the root directory of the microSD card in the reader.
4. Restart the reader.

Set USB mode to Charge-and-Data

1. Create a blank AUTO.TXT file.
2. Add the following command (without quotations): “.fd -ep cd”.
3. Place the file within the root directory of the microSD card in the reader.
4. Restart the reader.

Connecting with *Bluetooth*[®] Wireless Technology

Comparison of *Bluetooth* Operating Modes

The reader supports two modes of operation over *Bluetooth*. When connected via USB the reader always supports the ASCII 2 protocol, but when connected over *Bluetooth* the reader can either be set to use the ASCII 2 protocol (*Bluetooth* SPP Mode) or it can appear as a *Bluetooth* keyboard (*Bluetooth* HID Mode.)

<i>Bluetooth</i>[®] SPP Mode	<i>Bluetooth</i>[®] HID Mode
Apps need to be written with specific support for the reader.	Apps can use the reader without modification.
The reader can be discovered and paired in the <i>Bluetooth</i> Settings or from within the App, but when the App controls the connection: <ul style="list-style-type: none">• Connects when instructed by the App.• Disconnects when instructed by the App.• The reader powers off when no longer connected and idle.• The App needs to connect to restore.	Reader is discovered and paired in the Host <i>Bluetooth</i> Settings (often appears as a Keyboard): <ul style="list-style-type: none">• After pairing the reader connects automatically.• If idle, the reader sleeps and the connection is dropped.• The reader, when woken, automatically reconnects to the host device.
Apps receive and interpret ASCII 2 Protocol responses when the user triggers a UHF or barcode scan.	Apps receive input as key strokes from the reader, including tab and return/enter keys.

Bluetooth® SPP Mode	Bluetooth® HID Mode
<p>The App can respond and react intelligently to responses.</p> <ul style="list-style-type: none"> • Duplicate responses can be ignored or counted. • Incoming tag data can be truncated, stripped, or transformed into alternative representations: Hex, ASCII, GS1 EPC URI, etc.. 	<p>The reader types text for each barcode/UHF scan received.</p> <ul style="list-style-type: none"> • The tag values can be returned in Hex or ASCII representations. • Up to two additional characters can be inserted before and after the text sent. • The reader cannot truncate or strip values from tag data.
<p>The App can change the readers behavior.</p>	<p>The reader can only send scanned data to the host. The host cannot change the reader's behavior.</p>
<p>The reader's behavior and command parameters are controlled in real time by the App, e.g. the trigger action can change to suit the task that the user is performing; the App can allow the user to specify inventory output power.</p>	<p>The reader's behavior, such as the action of the reader's trigger switch, the inventory output power the idle sleep timeout, and other command parameters can be configured only once at start-up.</p>
<p>Configuration is held within the App (an configuration in the AUTO.TST is likely to be overridden by the App settings.)</p>	<p>All configuration is held in an AUTO.TXT file stored on a SD card. Removing the SD card or deleting the AUTO.TXT and power-cycling the unit restores default settings.</p>
<p>All read activity, by default, is saved to a log file if an SD Card is fitted.</p>	<p>All reader activity, by default, is saved to a log file if a SD card is fitted.</p>

Change the *Bluetooth* Operating Modes

The IH21 reader can be operated in SPP mode where the reader is controlled by a custom written application or in HID mode, where the reader behaves like a *Bluetooth* keyboard.

Preparation

Download and install the “PC Firmware Downloader” from Honeywell’s website at www.honeywellaidc.com.

Switch to *Bluetooth* HID Mode

1. Delete existing pairings to the reader.
2. Launch the firmware downloader (Desktop Firmware Loader.)
3. Connect the reader to the computer via USB. The driver should install automatically and the downloader should prompt as the com port arrives and select the com port automatically (“COMn arrived.)
4. Select **Action > Reset *Bluetooth* to HID mode.**
5. Disconnect the reader from the computer.
6. Wake the reader by pulling the trigger. The blue LED will flash.

7. Pair to the reader on the device.
8. Scanned data should now be typed into the current application on the device.

Switch to *Bluetooth SSP Mode*

1. Delete existing pairings to the reader.
2. Launch the firmware downloader (Desktop Firmware Loader.)
3. Connect the reader to the computer via USB. The driver should install automatically and the downloader should prompt as the com port arrives and select the com port automatically ("COMn arrived.)
4. Select **Action > Reset Bluetooth to SPP mode** (wait for the process to complete.)
5. Disconnect the reader from the computer.
6. Wake the reader by pulling the trigger. The blue LED will flash.
7. Pair to the reader on the device.
8. Launch an Application (e.g. RFID Explorer) to use the reader.

MAINTENANCE AND TROUBLESHOOTING

Maintenance

For trouble-free service please observe the following tip when using the IH21 Reader:

- Protect the IH21 Reader from temperature extremes. Do not leave it on the dashboard of a car on a hot day and keep it away from heat sources.

Troubleshooting

Symptoms	Possible Cause	Action
Nothing happens when the button is pressed.	If the LEDs are not on, then the battery may need to be charged.	Charge the reader.
	The reader may have button actions disabled.	Check the reader configuration and restore to defaults.
The orange LED flashes rapidly when charging.	There is a battery fault.	Replace the battery pack.
	The battery pack temperature is outside recommended limits.	Ensure charging only occurs between 41°F and 104°F (5°C and 40°C.)
The host <i>Bluetooth</i> ® discovery does not find the reader.	The reader has powered off.	Press the button and ensure the blue LED is flashing.
	The reader is out of range.	Move the reader closer to the host.
	The <i>Bluetooth</i> ® friendly name of the reader has been changed.	Check the <i>Bluetooth</i> friendly name or restore the reader to factory defaults.
Opening the <i>Bluetooth</i> virtual com port does not connect to the reader.	The host has paired to a different <i>Bluetooth</i> device.	Pair to the required reader.
	The host <i>Bluetooth</i> function has an error.	Warm boot the host. If this does not help, delete the reader from the favorites list and re-pair.

Symptoms	Possible Cause	Action
<i>Bluetooth</i> pairing fails.	The PIN on the reader has been changed.	Set the <i>Bluetooth</i> PIN to a known value.
Other symptoms.	Other fault.	Run ASCII Remote Diagnostic and contact Support.

Honeywell
9680 Old Bailes Road
Fort Mill, SC 29707

www.honeywellaidc.com