# RT03 Active RFID

## Garrison Rugged 2.4GHz RFID Active Tag

User Manual

(HKRAT-RT03)

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# FCC Compliance

This equipment has been tested and complies with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE 1: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

NOTE 2: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## CE Compliance

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures. This equipment complies with the requirements relating to electromagnetic compatibility, EN55022 Class A, the essential protection requirement of Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

# Table of Contents

# 1. Introduction

## 1.1 Purpose

RT03 Active Tag provides excellent reading range and reliability for industrial applications in extreme or harsh environments like construction sites and tunnels.

With its robust design, it is durable and reliable even in environments with metal and other non-RF-friendly items. This ensures an accurate readability. It is also suitable for working under heavy duty environment.

RT03 enables the most cost effective operation in the long term. Unlike other active RFID tags, RT03's battery is replaceable while the tag is still waterproof and dust-proof. Operators can replace a new battery when it runs out.

RT03's mounting design allows users to apply it on various items easily. It is user-friendly and convenient to install.

## 1.2 Features

Waterproof, Dust proof, Shock proof, IP65

Replaceable Battery

Convenient Mounting Design

Stable Performance

Durable with special plastic

## 1.3 Definitions, Acronyms and Abbreviations

| | |
|---|---|
| **RF** | Radio frequency |
| **FCC** | Federal Communications Commission |
| **CE** | Conformité Européenne |

## 1.4 Applications

The active RT03 provides excellent RF performance, compact in size and convenient to be used together with keychain. With its relatively low cost, RT03 also has excellent reading range and reliability for industrial applications such as vehicle management, warehouse management and so on.

### 1.4.1 Vehicle Management

With RT03's mounting design, RT03 can be attached on vehicles easily. When vehicles go in or out a zone, the reader will read the tag and the vehicle information will be shown in the system simultaneously. It can make the vehicle management more convenient.

### 1.4.2 Warehouse Management

With RT03's excellent anti-collision function, the reader can read more than 100 tags simultaneously. When a load of goods go in or out a warehouse, the reader will read the tags at once and the goods' information will be recorded immediately. This enhances the efficiency in warehouse management.

### 1.4.3 Heavy dusty, Harsh Environment Applications

RT03 is waterproof, dust proof and shock proof. Hence, RT03 can work in a heavy dusty and harsh environment such as construction sites.

Application cases are endless. Please e-mail to sales@HKRFID.com for more examples.

# 2. Installation

## 2.1 Battery Installation and Power On

Step 1: Loosen the two screws;

Step 2: Remove the battery cover;

Step 3: Insert the CR2450 battery from the side with its positive pole upward and negative pole downward; (Please do not use other battery model)


Step 4: Lay the battery cover flat on the compartment that has installed battery and put the two screws into the holes;

Step 5: Screw the nuts tightly;

Step 6: Check if latches are in right place or so long as the whole cover is not deformed, it's OK;

Step 7: Finish installation, RT03 start work.

Since RT03 has factory default setting at delivery, users simply install the battery according to above steps and the tag will start communication with readers.

## 2.2 How to Read Tag ID

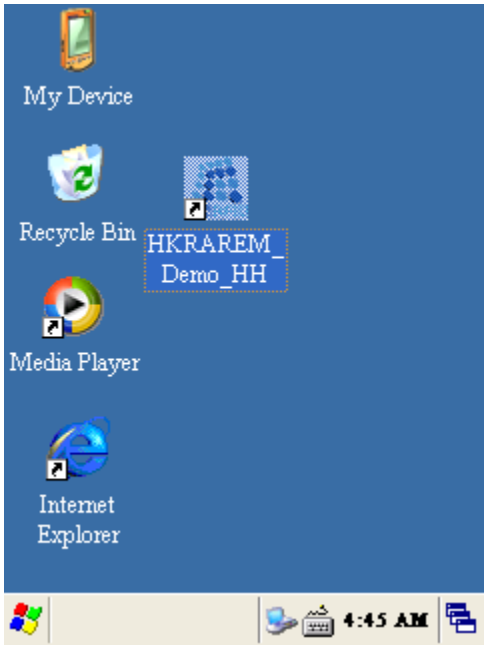
Hong Kong RFID Limited provides two devices for active tag reading, including RT03. One of them can be used for using RT03 Tag ID.

1. Using EmpressTM EM02 Handheld
2. Using PC with EmpressTM EM02

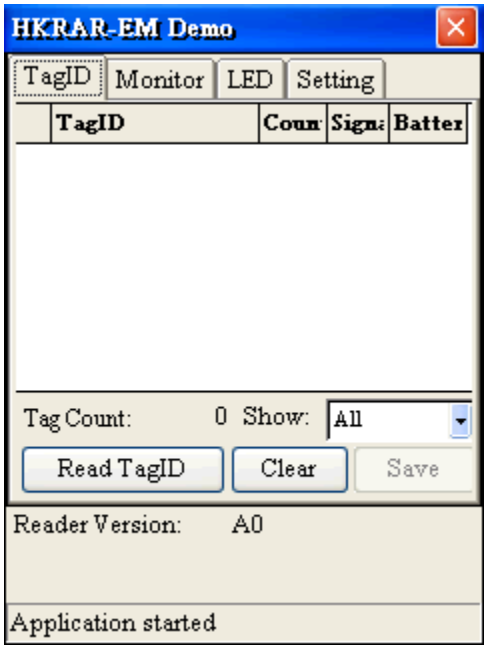
### 2.2.1 EmpressTM EM02 Handheld

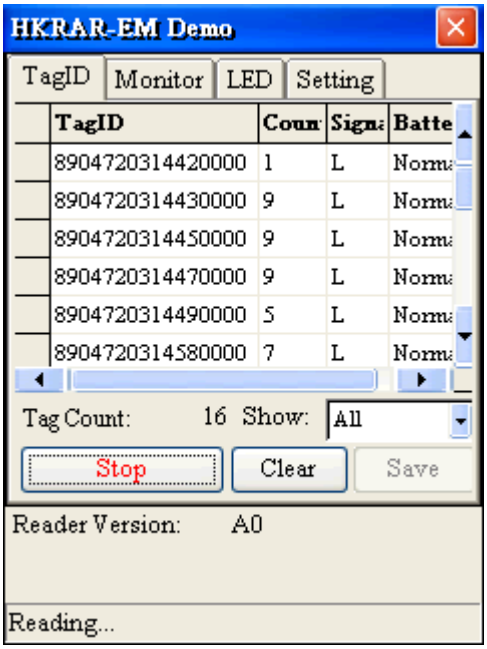
(Please refer to EmpressTM EM02 Handheld User Manual for details.)

Step 1: Open the apps on the Handheld;



Step 2: Click “Read TagID” to discover all surrounding active Tag with include RT03.



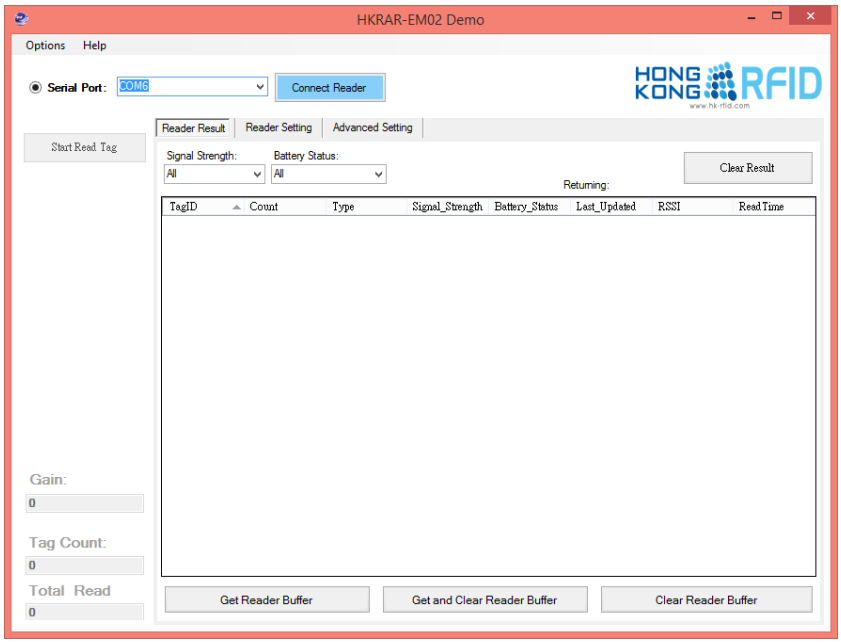



### 2.2.2 PC with Empress™ EM02 Reader

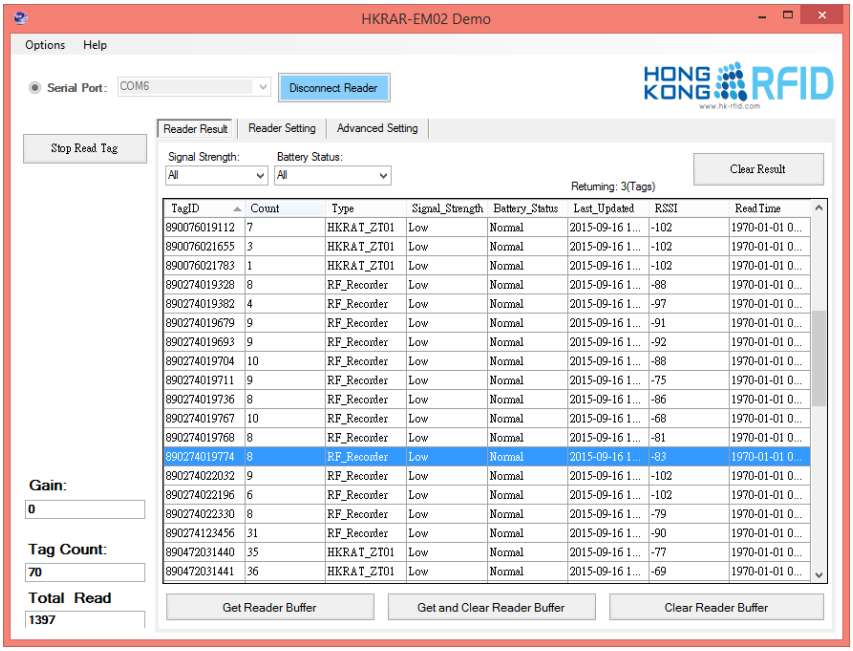
(Please refer to Empress™ EM02 User Manual for details.)

Step 1: Connect Empress™ EM02 to PC (Comport/Ethernet);

Step 2: Open the software on PC;




Step 3: Click “Start read” to discover surrounding all active Tag with include RT03.



## 2.3 Problem Shooting

| | Possible causes | Solutions |
|---|---|---|
| **Unstable signal** | Interfered by metal objects | Check objects around the tag and remove metal ones |
| | Low battery | Replace battery |
| **No signal after battery installation / replacement** | Improper battery installation | Check battery status |
| | Low battery | Replace battery |
| | Reader installed incorrectly | Check installation with EMWF Reader User Manual |
| **Case damaged** | Improper storage / hit by hard objects | Contact your supplier for replacement |
| **Contact plate of battery rusted** | Improper storage / affected by moisture | 1) Purchase a new tag;<br>2) Keep in a dry and airy place. |
| **Part of/whole case body turns yellow** | Improper storage / put under direct sunlight for a long time | 1) Purchase a new tag;<br>2) Keep in shady, cool and airy place;<br>3) Avoid direct sunlight. |
| **Cannot purchase proper battery** | -- | Contact your supplier |
| **Contact plate of battery deformed / floats up** | Battery installed incorrectly | 1) Refer to Battery Installation;<br>2) Purchase a new tag. |
| **Sticker falls off** | Improper storage / affected by moisture | 1) Purchase a new tag;<br>2) Keep in dry and airy place. |
| **Reading range** | Affected by environmental conditions, e.g.: ambient humidity, surrounded by water-rich/metal objects | 1) Avoid water-rich / metal objects;<br>2) Keep in dry and airy place. |
| | Wrong direction of antenna of reader | Adjust direction of antenna |

Please contact your supplier for replacement provided that the product is of non-artificial damage during the Guarantee Period.

# 3. Specifications

## General Specifications

| | |
|---|---|
| **Indicator** | Tri-color LED |
| **Sensor** | Press Button<br>Magnetic Sensor<br>Temperature Sensor<br>Humidity Sensor<br>Accelerometer Motion Sensor |
| **Connection** | 2.4Ghz Proprietary<br>Bluetooth Low Energy<br>NFC |
| **Memory** | 256kbit EEPROM |

## Radio Frequency Specifications

| | |
|---|---|
| **Frequency** | 2.4GHz -2.5GHz ISM |
| **RF Power Output** | 0-4dBm |
| **Power** | 4-15uA, 3V |
| **Reading Range** | 30~ 50m (Line of Sight) |
| **Modulation** | FSK |
| **Data Rate** | 1-2 Mbps |
| **Communication Mode** | Proprietary radio mode<br>Bluetooth Low Energy mode |
| **Operation** | 2-way communication |

## Power Supply Specifications

| | |
|---|---|
| **Battery** | CR 2450 (Battery Replaceable) |
| **Voltage** | 3V |

## Environmental & Hardware Specifications

| | |
|---|---|
| **Working Temperature** | -20°C to 60°C |
| **Case Material** | Plastic |
| **Case Dimension** | 78.8mm × 33.6mm × 9.7mm |

## Temperature Sensing Specifications

| | | |
|---|---|---|
| **Temperature Detecting Range** | -20°C to +70°C | |
| **Temperature Operating Range** | -30°C to +80°C | |
| **Temperature Sensor Accuracy** | 25°C:<br>0°C to +65°C:<br>-40°C to +125°C: | ±0.1°C<br>±0.3°C<br>±0.5°C |
| **Temperature Sensor Resolution** | 0.1°C | |

## Humidity Sensor Specifications

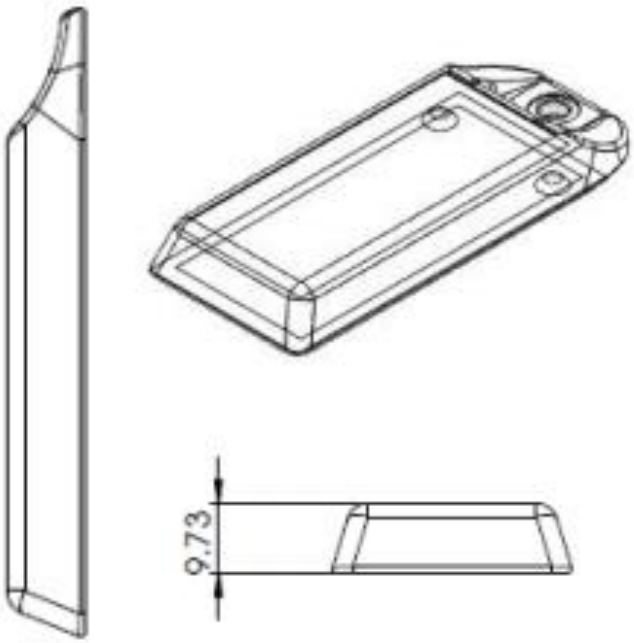
| | |
|---|---|
| **Temperature Detecting Range** | -30°C to +80°C |
| **Temperature Operating Range** | -30°C to +80°C |
| **Temperature Sensor Accuracy** | ±0.5°C |
| **Temperature Sensor Resolution** | 0.5°C |
| **Humidity Detecting Range** | 0 - 100% |
| **Humidity Resolution** | 1% |
| **Humidity Accuracy** | ±4%[1]<br>±5%[2] |

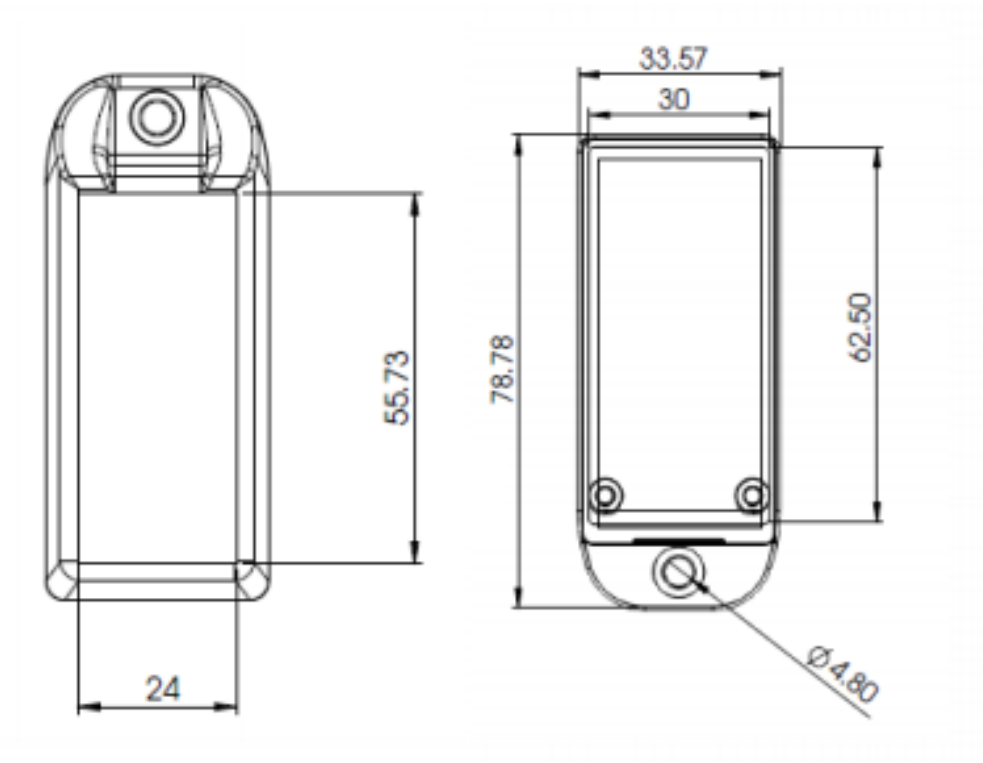
## Accelerometer Specifications

| | |
|---|---|
| **Measurement Range** | ±2.0g |
| **Sensitivity** | 1-16mg/digit |
| **Typical Accuracy** | ±40mg |

**Remark 1:** Accuracy is specified at the typical supply voltage of 3.3 Vdc and at 25 °C [77 °F]. It is the maximum deviation from the ideal transfer function of relative humidity measured over the humidity range of 10 %RH to 90 %RH.
**Remark 2:** Total error band is the maximum deviation from the ideal transfer function of relative humidity over the compensated range of 5 °C [41 °F] to 50 °C [122 °F].

## 4. Product Dimension






## 5. Maintenance

### Warranty for RFID Device (Consumables)

### TERMS and CONDITIONS

HKRFID warrants RFID Devices (Consumables) sold to customers (the "Device(s)") against defects in workmanship and materials for a period of **three (3) months** from the original date of delivery under the following conditions: -

1. Customer's sole and exclusive remedy and the entire liability of HKRFID under this warranty will be, at HKRFID's option, repair or replacement of the product if reported within the **period of warranty** after the defect;
2. The warranty card must be presented together with the official purchase receipt or dealer's invoice when warranty service is rendered. Otherwise, HKRFID reserves the right to refuse the provision of free warranty during the warranty period;
3. All sales are final. In no event does HKRFID warrant or accept the return of Device is error free or that customer will be able to operate the product without problems or interruptions;
4. Customers may return defective Devices to HKRFID for **one-to-one replacement within three (3) months** under the terms and conditions set forth in this warranty;
5. Before returning any Device for replacement, be sure to back up data and remove any confidential, proprietary, or personal information from the Device. HKRFID is not responsible for the damage to or loss of any data which the customer do not back up;
6. The customer is responsible for returning the defective Device at his/her own expense;
7. A fee (excluding material fee) will be charged at the HKRFID's discretion for any out-of-warranty service under the circumstances described in Item 9 below;
8. For any uncertain or doubtful occasion, after examination, HKRFID has the right to alter or refuse to issue or to cease this warranty;
9. Restrictions: The warranty DOES NOT apply if the product has been: (a) explicitly or implicitly altered or repaired in any way by anybody other than qualified and authorized technical officers of HK-RFID; (b) damaged due to failure to follow installation or operation instructions, abuse, negligence, fire, flood, acts of God (including, but not limited to, lightning strikes), natural calamities, electrostatic discharge damage, failure to provide suitable operating environment, improper transportation and storage or other events beyond HK-RFID control and damage that is caused during shipping for warranty and maintenance services and any Device that is returned with the security seal broken; or (c) the product model number label or serial number has been effaced or altered; (d) the product is under normal wear and tear after typical usage, including but not limited to circumstances of dirt abrasion, fading due to exposure to UV light, exposure to humidity.
10. HKRFID reserves the rights to alter the terms and conditions each year. The terms and conditions are subject to change without prior notice.

# 6. System Requirements

Below are the requirements for equipment and facilities to run RT03.

| | |
|---|---|
| Server System for HCDS Server | |
| Intel Xeon E3 or above<br>4GB RAM or above<br>500GB Harddisk free space<br>LAN 100/1000<br>Windows Server 2008 R2<br>Firewall and Anit-Virus<br>.NET framework 4.0 or above<br>Microsoft SQL Database or Express 2008 R2<br>Data Backup Device and Software are required<br>UPS or others power protection is required<br>Physical Server protection is required | 1 Set |
| Client Workstation | |
| Intel Core 2 Duo or above<br>2GB RAM above<br>100GB Harddisk free space<br>LAN 10/100/1000<br>Internet Explorer 9 or above<br>Firewall and Anit-Virus<br>Windows XP, Windows 7/Pro and Windows 2008 | - |

| Network and Connectivity | |
|---|---|
| <u>For HCDS Server</u><br>Firewall Protected Network Environment<br>Fast and Stable Internet Connection<br>Fixed IP forwarding<br>HTTPS for Web Connectivity and SSL Certificate<br><br><u>For Client User PC</u><br>Personal Firewall<br>Anit-Virus Software<br>Internet Connection with allowing follow ports:<br>- 80<br>- 8080<br>- 5000<br><br>For RFID Handheld (HKRUR-8080)<br>Internet Connection through Windows Active Sync Services, or<br>WIFI Internet Connection | |

*For and on behalf of*

HONG KONG RFID LIMITED

*Accepted by*

_____

Authorized Signature

_____

Company's chop & Authorized Signature