

Radicom Research, Inc.

Designer's Guide for

RB8762C Series

(RoHS BLE 5.1 Serial Bluetooth Modules)

FC **CE** **IC** **RoHS** Compliant

SIG DID: D057234

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Introduction

Thank you for choosing Radicom RB8762C Module. We are committed to providing you quality service and technical support. The RB8762C modules are designed to meet OEM's needs of embedding low power, wireless data connectivity to their products. The RB8762C family offers a quick and simple solution for wireless Bluetooth communications.

Radicom RB8762C module is designed to meet the emerging market for Bluetooth 5.1 applications. These embedded Bluetooth 5.1 modules integrate entire profiles, applications, and Bluetooth protocol stack, and no external processor is needed. It also contains 256KB flash memory and 80KB RAM.

The RB8762C can be factory configured for other Bluetooth cost-effective and power-efficient wireless consumer products such as watches, medical sensors, mice, TV remote controls and fitness trainers. **Contact Radicom** for help to add the BLE Data Protocol functionality to your 5.1 Bluetooth device or for help in determining which Bluetooth Module is the best fit for your particular Bluetooth application.

The RB8762C family modules can be powered with standard 1.8V~3.6V low power. In lowest mode it consumes only 1.1 nA level power and will wake up in few hundred microseconds. The RB8762C family provides superior performance in the presence of interference from 802.11 (WiFi) wireless devices and other 2.4GHz radios.

The RB8762C modules support quick connections and data transfers allowing an application to establish a Bluetooth connection within a few milliseconds for short communication bursts before quickly disconnecting the Bluetooth connection to save power. It takes much less time to make a connection than conventional Bluetooth wireless technology and consumes approximately only 1/20th of the power of Bluetooth Basic Rate.

The RB8762C is available in surface mount (SMD) or through-hole (DIP) hardware designs. The RB8762C module is the surface mount model. The RB8762C can also be mounted on a conversion board to create the RB8762CHM model for serial through-hole designs.

RB8762C EVK and BLE Functionality

Radicom provides RB8762C-EVK (development kits) as a quick platform for testing and evaluating the RB8762C and RB8762CHM Bluetooth modules. The kit includes two RB8762C modules mounted on the RB8762CHM DIP Module. Each RB8762CHM is installed into a RB8762CMB evaluation board. One of the RB8762CHM is configured to operate in BLE Data Protocol Master Mode. The other RB8762C-HM is configured to operate in BLE Data Protocol Slave mode. The RB8762CMB boards have an RS232 Serial Port connector and USB interface that allows the user to immediately connect to any standard serial port to evaluate the Bluetooth modules.

The RB8762C modules are defaulted to use the BLE Data Protocol. For BLE Data Protocol operation, you need one Radicom Master and one Radicom Slave module. The Slave Model RB8762C-S advertises or broadcasts the Bluetooth signal. The Master Model RB8762C-M will scan for Bluetooth signals and then request a Bluetooth connection. The RB8762C-S Slave can then accept the connection for BLE Data transfers. The RB8762C-S Slave can also operate with remote devices that also support the BLE Data Protocol.

Features

- Support the Bluetooth 5.1 core specification
- Frequency Range 2.402 – 2.480 GHz
- Integrate MCU to execute Bluetooth protocol stack
- Ultra low power consumption with intelligent PMU
- Supports Master and Slave modes
- Support fully multiple Low Energy states
- Support LE L2CAP Connection Oriented Channel Support
- Support LE low duty directed advertising
- Support LE data length extension feature
- Integrated Bluetooth low energy stack including ATT, GATT, SMP, L2CAP, GAP
- Generic Applications for GAP Central, Peripheral, Observer and Broadcaster Roles
- Support OTA (Over-the-Air) programming
- Firmware upgradeable through serial port
- Support internal 32KHz OSC or external 32KHz clock input for low power mode
- Low power 3.3V operation
- TX Power: 4.0 dBm Max ~ RX Sensitivity: -92.5dBm Min
- Range: Up to 20 meters (line of sight)
- 15 GPIOs, 3 configurable LED pins
- Hardware Keyscan and Quad-decoder
- Embedded 256KB flash
- Embedded IR transceiver
- Embedded 8-CH 12-bit ADC
- Embedded G-sensor
- Support AES128/192/256 encrypt/decrypt engine
- Serial Interface (SPI / I²C / PWM)
- Support 3wire/2wire SPI
- Wake-up interrupt
- Watch Dog Timer
- Small sizes:RB8762C ~ 0.67" x 0.59"
RB8762CHM ~ 0.67" x 1.09"
- On-board microprocessor, RAM and ROM
- On-board antenna or on-board U.FL connector for external antenna
- 0°C to +70°C temperature operating

Approvals

FCC Certification

- 47 CFR FCC Part 15.247 & ANSI C63.10 2013 KDB 558074 D01 v03r05
- FCC 1.1310

CE Certification

- EN 300 328 V2.1.1
- ETSI EN 301 489-17 V2.2.1 / ETSI EN 301 489-1 V1.9.2
- EN 61000-3-2: 2014 / EN 61000-3-3: 2013
- EN 55032: 2015 / EN 55024: 2010+A1: 2015
- ETSI EN 301 489-17 V2.2.1
- ETSI EN 301 489-1 V1.9.2
- EN 61000-3-2: 2014
- EN 61000-3-3: 2013
- EN 55032: 2015
- EN 55024: 2010+A1: 2015

IC Certified

RoHS Compliant

Electronic Characteristics

	Minimum	Typical	Maximum	Unit
Operation voltage	2.35	3.3	3.6	V
Output Power			4.0	dBm
Sensitivity	-92.5			dBm
Current Consumption *				
Pairing mode		4.4		mA
RX active		6.9		mA

※The Current Consumption is code dependent. Bluetooth functions and characteristics will vary depending on the application firmware that is loaded into the RB8762C module. The standard code is for BLE Slave. Using any RB8762C I/O (output) will draw more current and change the overall current consumption.

Model Naming System

Product Series:

RB8762C- (x) - (x)

Optional

a: on-board antenna

c: IPEX connector

Optional

G: with G sensor

Blank: without G sensor

FCC/CE certified:

RB8762C-(a/c)-G

RB8762C-(a/c)

IC certified:

RB8762C

RB8762C Module Mechanical Dimensions & Pin Definitions ***Definitions***

Size:

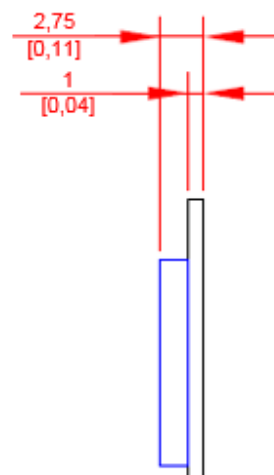
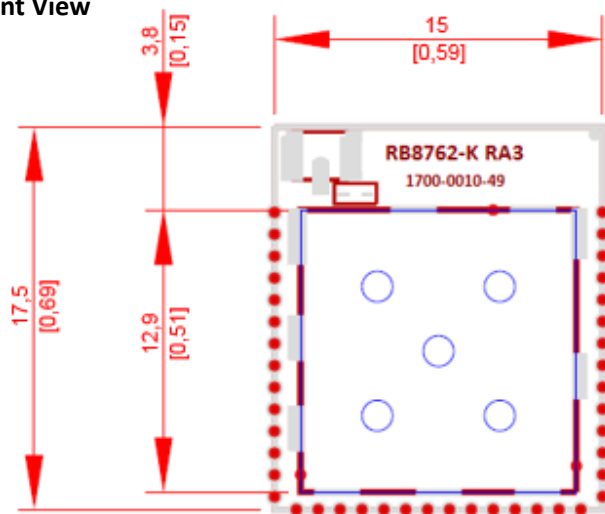
Top View

Unit: mm[inch]

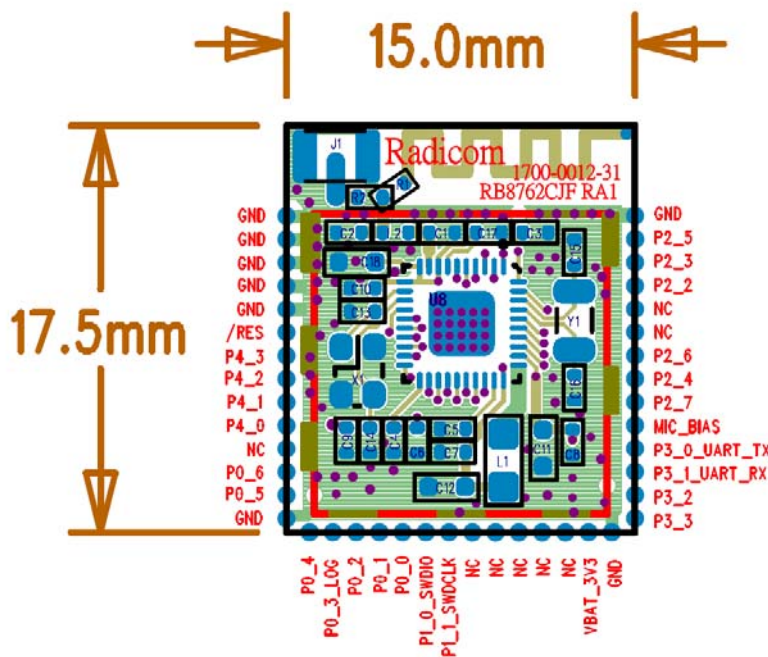
Module= 17.5 x 15.0 x 2.75 mm [0.69" x 0.59" x 0.11"]

Front View

Side View



Pin Definitions

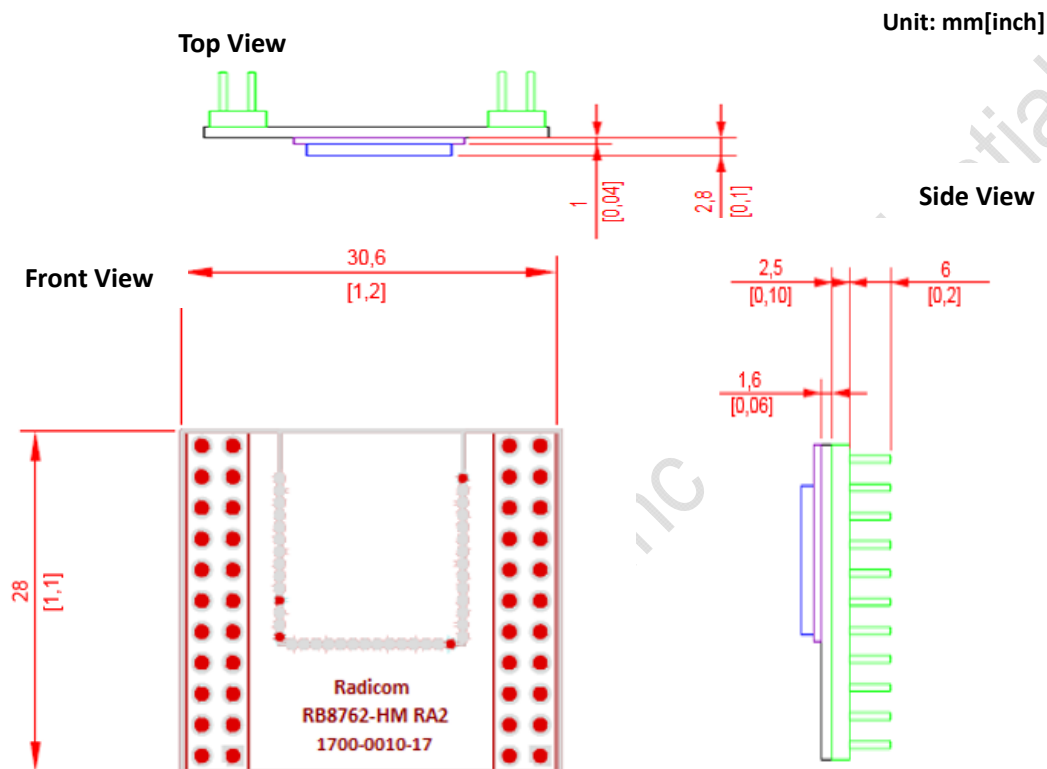


RB8762CHM Mechanical Dimensions & Pin Definitions

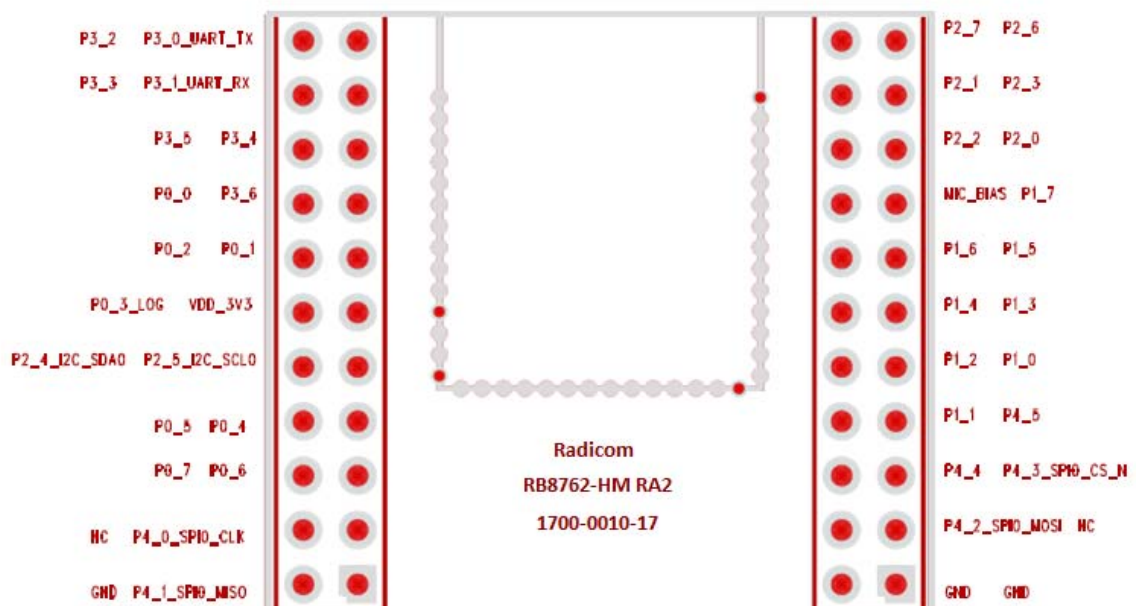
Size:

RB8762CHM(w/o pin header)= 30.6 x 28 x 5.6 mm [1.2" x 1.1" x 0.24"]

Pin header pitch = 6mm [0.2"]



Pin Definition



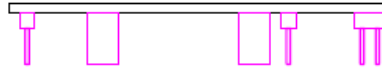
RB8762CMB Mechanical Dimensions

Size:

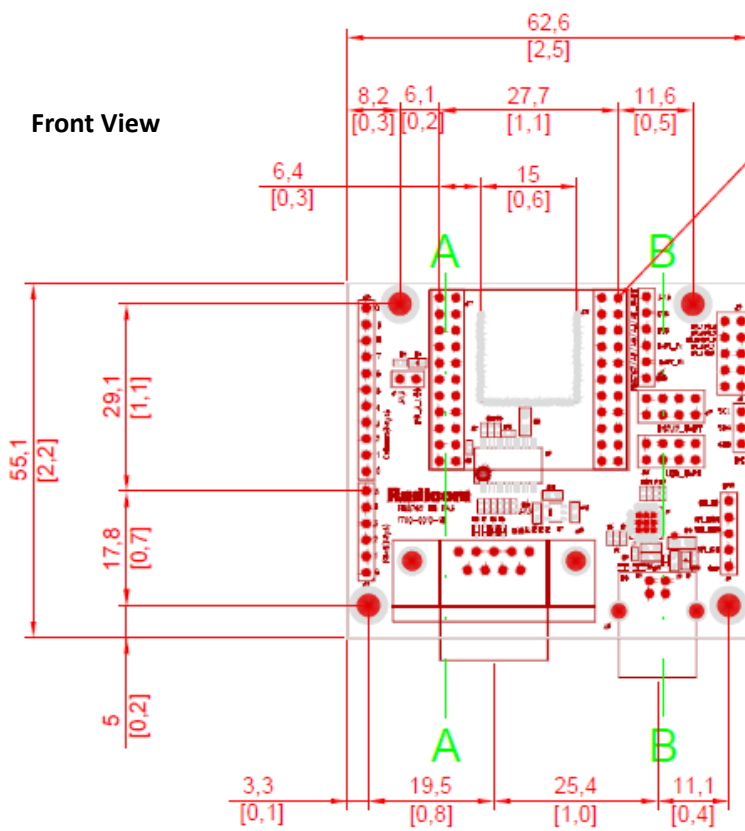
Evaluation Board= 62.6 x 55.1 x 15.0 mm [2.5" x 2.2" x 0.6"]

Unit: mm[inch]

Top View



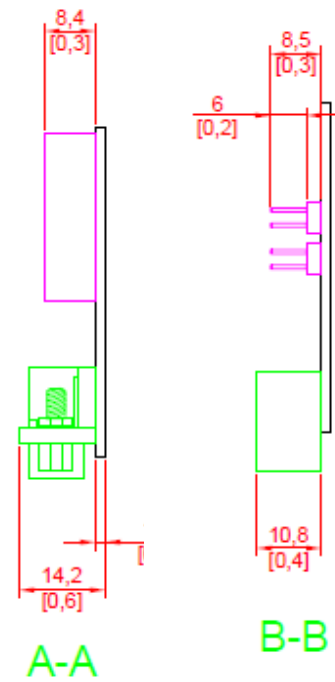
Front View



2-PH 2.54_2X11P;H=8.4

2-PH 0.10_2X11P;H=0.33"

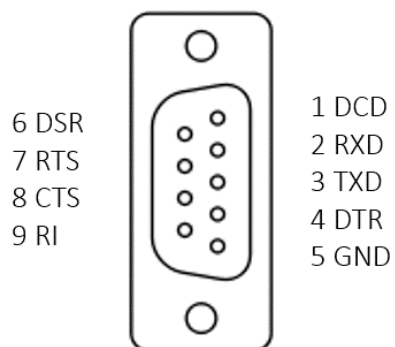
Side View



RB8762CMB RS232 DB9 Pin Definitions

The pin definitions of DB9 used on the RB8762CMB RS232 Serial Connector are as follows:

Pin	Signal name
1	DCD (Input, Carrier Detect)
2	RXD (Input, Received Data)
3	TXD (Output, Transmit Data)
4	DTR (Output, Data Terminal Ready)
5	GND (Ground)
6	DSR (Input, Data Set Ready)
7	RTS (Output, Request to Send)
8	CTS (Input, Clear to Send)
9	RI (Input, Ring Indicator)



Layout Design Suggestions

General Layout Rules:

All Printed Circuit Boards must comply with UL94V0 standard for flammability. Always use RoHS compliant Parts and materials.

Suggestions for Layout:

Step 1. Do not place Power circuit, X'tal, Inductor, etc. near RF area.

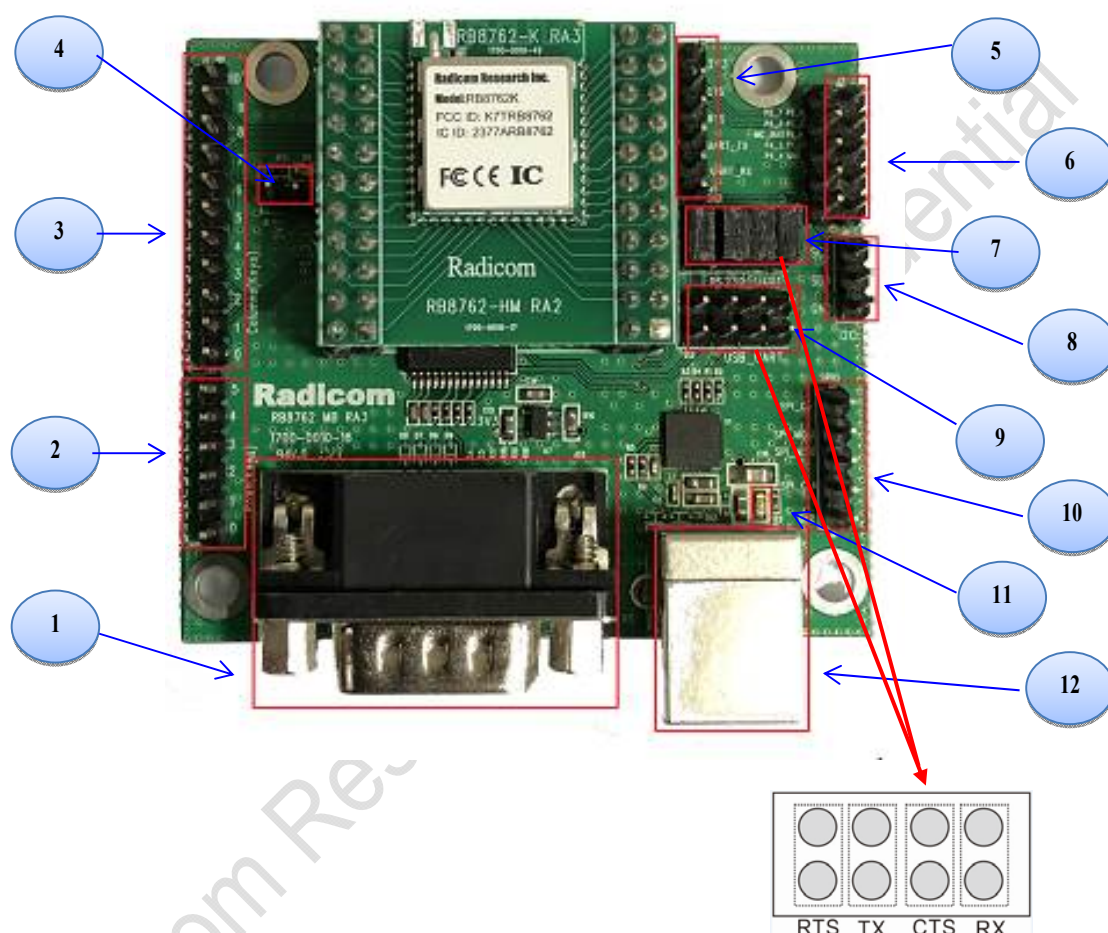
Step 2. The bigger Antenna clearance area, the better. The Antenna itself needs to stay away from any circuit or component at least 3mm. Antenna clearance area means Top and Bottom both required to be cleared.

Step 3. Do not use metal materials on design where near Antenna area. For example, battery snaps, USB connector, iron case, etc.

These guidelines are for design reference; real performance still depends on actual design.

RB8762C EVK Development Board Figure and Functions

The RB8762CMB Development Board has white silkscreen legend located by the switches and connectors described below.



1. RS232 male DB-9 connector (J32)
2. Rows keys (J14)
Row 0 > P1_2 , Row 1 > P1_3 , Row 2 > P1_4 , Row 3 > P1_5
Row 4 > P1_6 , Row 5 > P1_7
3. Columns Keys (J15)
Column 0 > P0_7 , Column 1 > P0_6 , Column 2 > P0_5 , Column 3 > P0_4 ,
Column 4 > P0_1 , Column 5 > P0_0 , Column 6 > P3_6 , Column 7 > P3_5 ,
Column 8 > P3_4 , Column 9 > P3_3 , Column 10 > P3_2
4. Erase flash memory (J1)

5. UART interface header (J3)
6. GPIO interface header (J2)
7. RS232 _ UART header (J17)
8. I2C interface header (J8)
9. USB_UART header (J13)
10. SPI interface header (J4)
11. Power LED indicator
12. USB 5V slot (U3)

Operating RB8762C MB

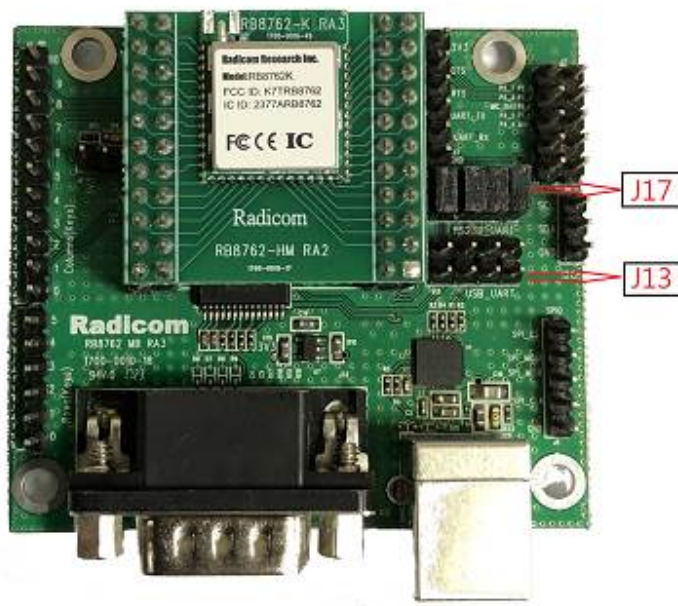
Introduction:

Radicom provides RB8762CMB Development Kit as a quick platform for testing and evaluating the RB8762CHM Bluetooth module. Each RB8762CMB has an UART and USB connector interface. You may choose either UART or USB interface for data transmission.

If you use **UART** interface to transmit your data, please plug one null cable to COM port and insert a 4 pieces jumper into J17 (as below). Also remember to connect USB connector for power supply. As long as connecting RB8762CMB with UART interface, you're able to check information of RB8762CMB, including role (master/slave), FW version, device name and BD address.

If you use **USB** interface to transmit your data, please plug one USB cable to USB connector and insert a 4piece jumper into J13 (as below). This USB connector can work as power supply and data transmission at the same time. With USB interface, you may use [AT-command](#) (at-i) to check information of RM8762MB.

After above connection, you can issue AT commands to instruct the modules to establish a Bluetooth connection to transmit and receive data through this USB-UART interface.



※The actual data transportation is USB to UART Bridge Virtual COM Port for this usage.

Please download CP2102 USB driver from below link:

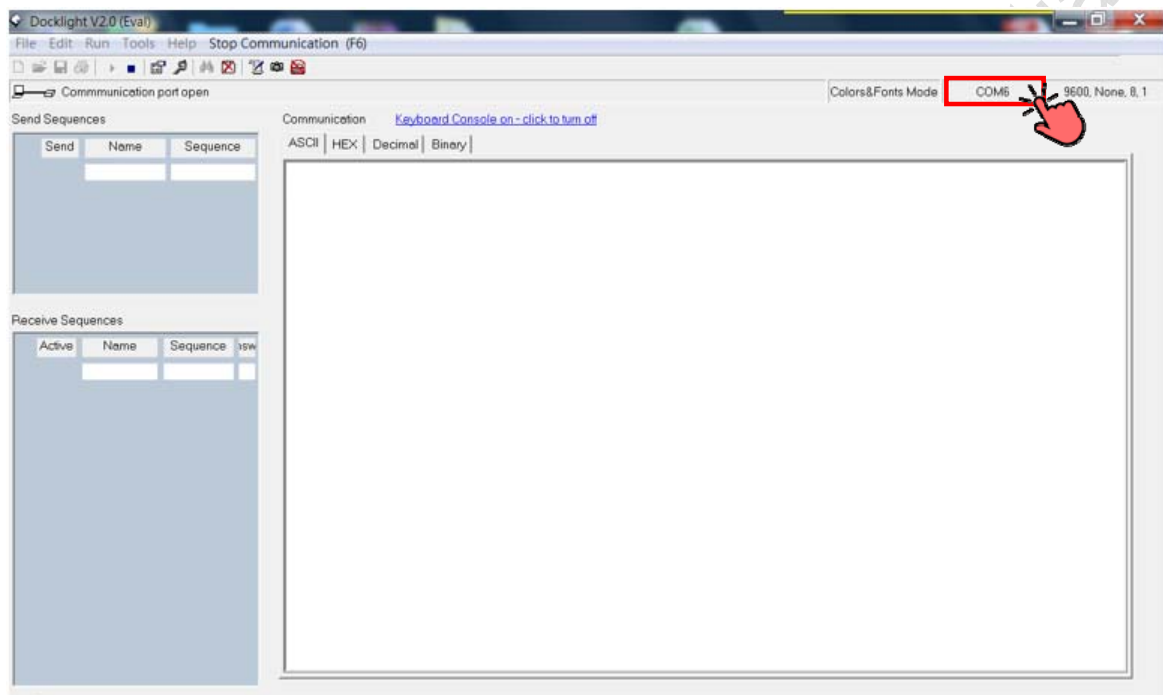
<http://www.silabs.com/products/mcu/pages/usbtouartbridgevcpdrivers.aspx>

Hardware Set-up - To provide power to the RB8762CMB, plug one end of the USB cable into USB connector on the RB8762CMB. Plug the other end into the PC USB port.

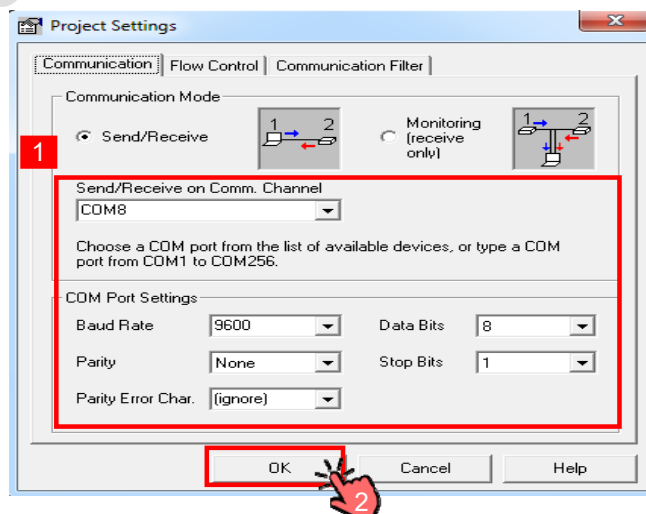
PC Set-up - Turn on the PC. To send the AT commands and transmit & receive data with the RB8762CMB use a serial communication package such as Docklight. Set the appropriate COM port for each side with the DTE speed set to 9600 and parity set to 8N1.

Docklight setting is as follows:

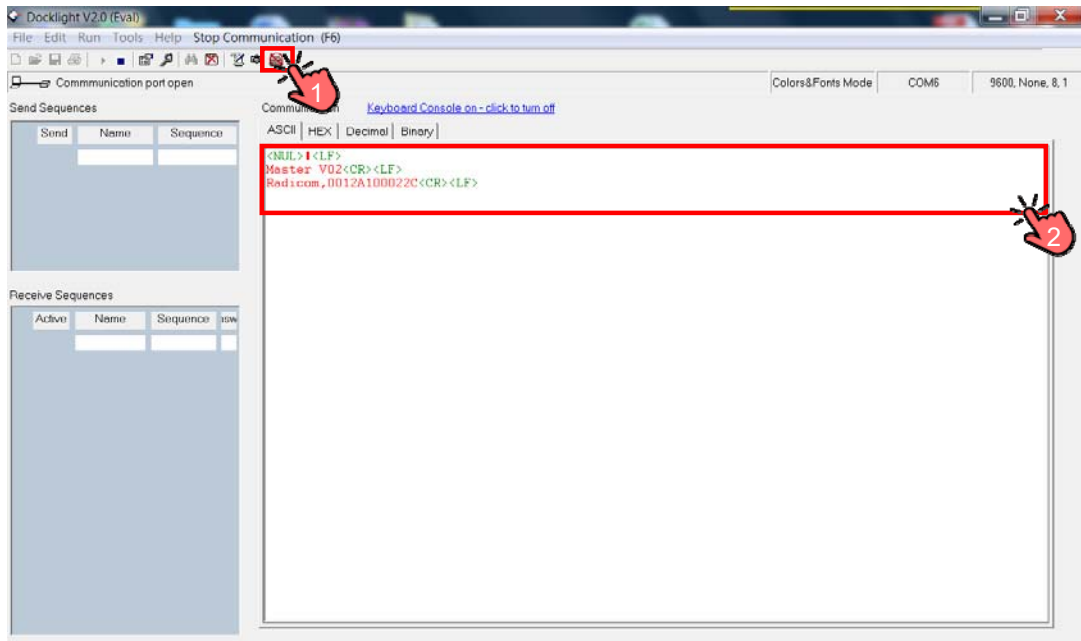
Step 1. Click upper-right corner of Docklight (as below) to enter “Project Settings”.



Step 2. Enter “Project Settings” and choose the appropriate COM port. Then set “COM Port Settings” as: **Baud rate: 9600, 8 data bits, None parity, 1 stop bits and None flow control.** Click “OK” to complete setting.



Step 3. After these steps, power on the RB8762CMB and you'll see device information as below.



※Actual version of RB8762CMB and BT device address might be different as above.

If you want to know the latest FW version, please contact Radicom.

Supported AT Command List

AT Commands	Slave Side	Master Side	Description
at	√	√	Test UART channel
at+laddr	√	√	Read BD address
at+name	√	√	Read device name
at+name<Parameter>	√	√	Set device name(Max. length=16 byte) Default name is “Radicom”. After changing name, you should use “at+reset\r\n” command and the new name will work.
at+baud	√	√	Check current Baud rate.
at+baud< Parameter>	√	√	Set Baud rate. Parameter range(1, 2,...,9): 1: 1200bit/s 2: 2400bit/s 3: 4800bit/s 4: 9600bit/s 5: 19200bit/s 6: 38400bit/s 7: 57600bit/s 8: 115200bit/s 9: 230400bit/s(USB only)
at+role	√	√	Check the role of device.
at+role< Parameter>	√	√	Role setting. Parameter range(0,1,2): 0: slave device 1: master device 2: The device will detect GPIO P1_0 state to decide to be a master or slave device. P1_0 is high, devcie will be master. P1_0 is low, device will be salve.
at+inq	Invalid	√	Get slave device’s BD address (Max.=10 slave, sequence number 0-9) After this command “at+sign” must be the next command

AT Commands	Slave Side	Master Side	Description
at+sinq	Invalid	√	Stop searching for BT device. *Must-do step, or master device will keep searching.
at+conn< Parameter>	Invalid	√	Connect a slave device. *Input parameter from “AT+INQ”.
at+i	√	√	Check role, FW version, device name and BD address
at+reset	√	√	Reboot the device

AT-Command in Docklight

Master EVB	Slave EVB
<p>Step 1. Enter “at+role=1<CR><LF>” to set as master.</p>	<p>Step 2. Enter “at+role=0<CR><LF>” to set as slave.</p> <p>Step 3. Enter “at+name<CR><LF>” to read device name. +Name=Radicom</p> <p>Step 4. Enter “at+laddr<CR><LF>” to read BD address. +LADDR=0012A1123456</p>
<p>Step 5. Enter “at+inq<CR><LF>”. Get slave’s BD address. OK. At+inq<CR><LF> +INQ<CR><LF> 0:0X0012A1123456</p> <p>Step 6. Enter “at+sinq<CR><LF>”. Stop the master from searching BT device. +INQE<CR><LF></p> <p>Step 7. Enter “at+conn0<CR><LF>”. Connect to slave device. OK<CR><LF> +CONNS<CR><LF> +CONNECTED>>0X12A1123456<CR><LF></p>	

※Device will enter data mode as long as connect. If you want access command mode again, please send “+++ath” to the connecting device. The device will leave data mode and enter command mode.

※Once power on the device, please wait 8 seconds to enter advertising mode.

Firmware behavior:

The current newest version is V08 and its major different with old versions are:

1. Booting

When RB8762C is booting, its role (slave or master) will depend on the setting value.

This value can be got by AT command “at+role\r\n” and the factory default value is “2”.

1.1 If the value is “0”, RB8762C will work as a slave.

1.2 If the value is “1”, RB8762C will work as a master.

1.3 If the value is “2”, RB8762C will be decided by GPIO P1_0. If GPIO P1_0 is high, RB8762C will be a master else it will be a slave.

2. Role

2.1 Slave

After booting, there are 10 seconds to execute AT command. After 10 seconds, slave will start advertising.

2.2 Master

After booting, there are 10 seconds to execute AT command. After 10 seconds, master will connect slave device automatically if master had ever connection history else enters AT command mode.

3. Connection state (connected or connecting)

Master or slave can send “+++ath” to UART to quit connection and enters AT command mode.

The old versions behavior:

The slave will advertise after booting 5 seconds and master won't automatically connect slave.

OTA Upgrade Firmware

This chapter will show you how to use OTA to upgrade firmware.

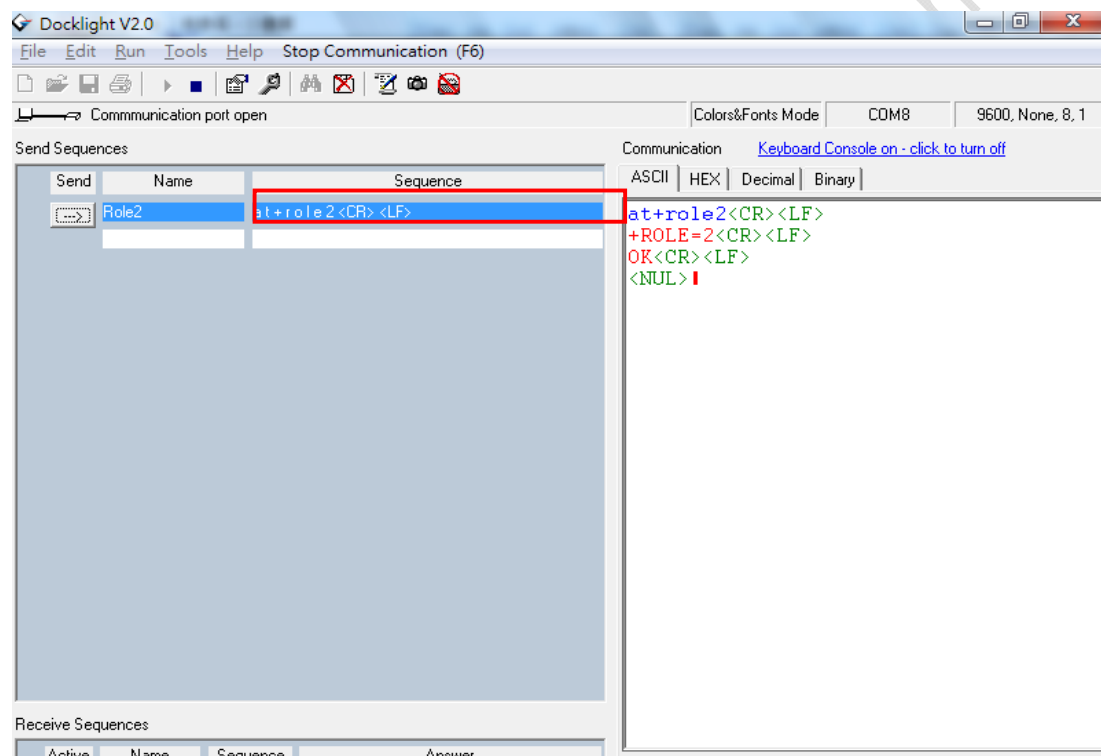
If the version of target device is larger than V07, please refer section 2.

Section 1

Step 1. Plug in USB cable to power on RB8762CMB.

Step 2. Follow [page18](#) to setup RB8762CMB with Docklight

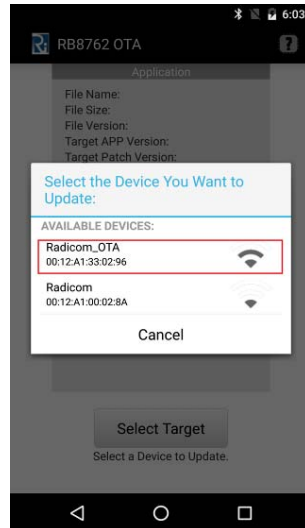
Step 3. Issue “**at+role2<CR><LF>**” to enter OTA mode(as below)



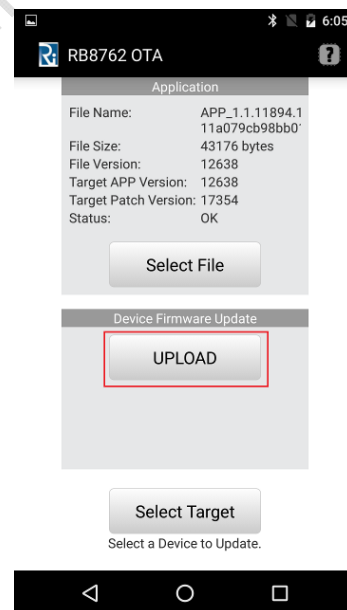
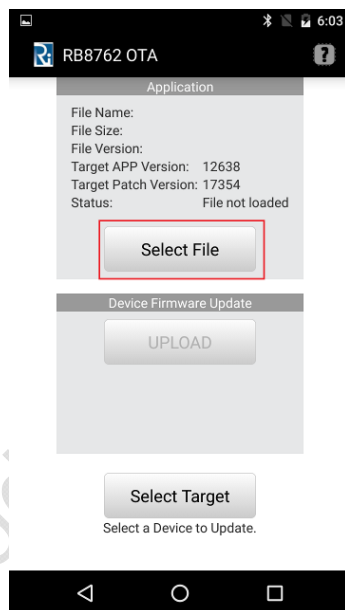
Step 4. Install OTA APP (OTA.apk) in your Android smart phone.

Step 5. Upload the latest firmware file into your smart phone.

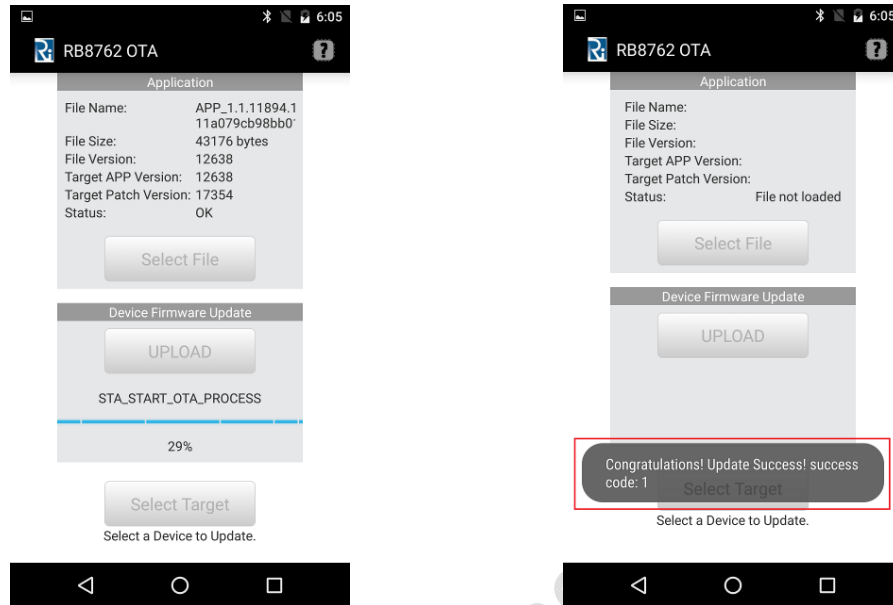
Step 6. Launch OTA APP and search for “Radicom_OTA” device. Then click the device to enter next step.



Step 7. Click “Select File” from APP. Click “UPLOAD”.



Step 8. The firmware upgrade will start immediately. Once the screen shows “Update Success!” means firmware upgrade successfully.



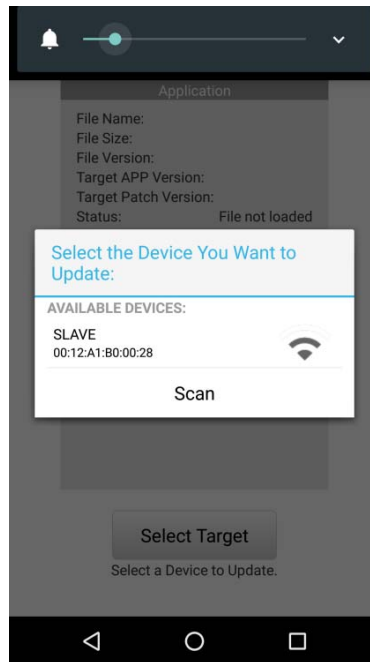
Step 9. When new firmware upgraded successfully through OTA, you must return RB8762CMB to its original mode (master/slave). Issue “**at+role0<CR><LF>**” to enter slave mode and “**at+role1<CR><LF>**” to enter master mode.

Section 2

Step 1. Install OTA APP in your smart phone and execute APP.

Step 2. Plug in USB cable to power on RB8762CMB.

Step 3. After 10 second, APP will scan BT device name. Then click to connect.



Step 4. “Select File” Radicom released image to upgrade the slave device then click “UPLOAD”

Step 5. Use iPhone LightBlue APP to connect with device and will see the version information



How to access RB8762C from smartphone

The RB8762C can support two mainly platform for smartphone (iOS and Android). You can access RB8762C from smartphone by 3rd app or your own designed app. Here we provide some notes for access RB8762C from smartphone, also some examples.

※This chapter assumes that the reader has a basic understanding of the BLE specification including some knowledge of service, characteristic and transfer protocols.

1. BLE support

The Android system applies to version 4.3 or above and requires Bluetooth Low Energy (BLE) support. iOS system are fully supported iPhone 4S and above devices.

2. Data transfer Service

Under BLE communication architecture, each BLE Device will be in accordance with the different applications to provide different Services. The RB8762C provides a Service to achieve data transfer with smartphone. Service related information are shown below.

Service uuid: 0000E0FF-3C17-D293-8E48-14FE2E4DA212

Characteristic uuid: 0000FFE1-0000-1000-8000-00805F9B34FB

3. Test RB8762C APP in google play and APP store

There're many BLE related application you can find in in both google play(Android) and App store(iOS). Or you may use below app to test RB8762C module.

In Android

[BLE Scanner: Read, Write, Notify](#)

In iOS

[LightBlue® Explorer](#)

4. Customed APP

If you want to build your own BLE APP, please refer to below official documents and examples.

Android

Documentation

<https://developer.android.com/guide/topics/connectivity/bluetooth-le.html>

Example

<https://github.com/googlesamples/android-BluetoothLeGatt/#readme>

iOS

Documentation

https://developer.apple.com/library/content/documentation/NetworkingInternetWeb/Conceptual/CoreBluetooth_concepts/CoreBluetoothOverview/CoreBluetoothOverview.html#//apple_ref/doc/uid/TP40013257-CH2-SW1

Example

https://developer.apple.com/library/content/samplecode/BTLE_Transfer/BTLE_Transfer.zip

The wired method upgrades RB8762C firmware code

1. Software platform and software

Windows 7 Service Pack 1, BeeMPTool2.0.5,

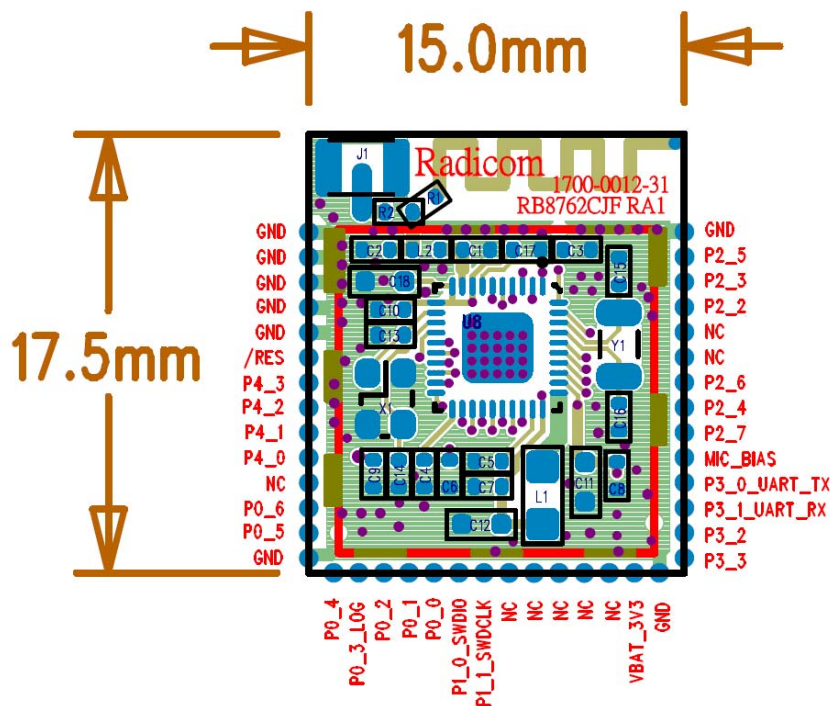
App image: APP_1.1.11894.12638-0d68345b87439211a079cb98bb0

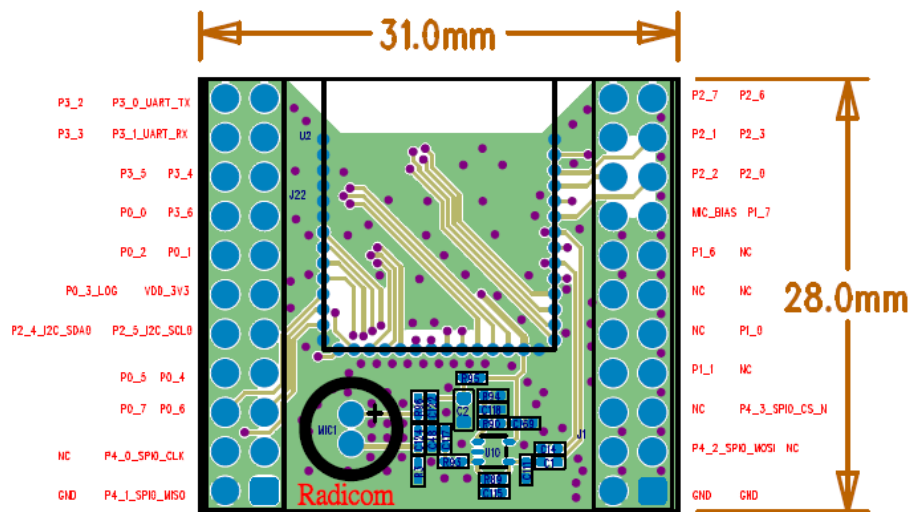
(The app image will change for each release.)

2. Hardware type:



3. Pin Definitions



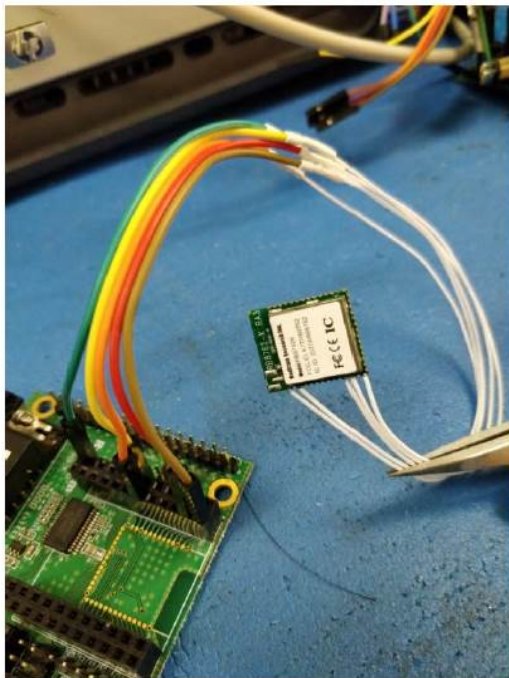


3.1 Wired Connection

We will use RB8762CMB to update firmware. In order to do that, we need connect these 5 wires from RB8762C module to RB8762CMB.

RB8762CMB is RB8762CEVK without the RB8762CHM

Below is the picture of our sample with 5 wires connected.



If your 8762C already soldered in your board and VDD_3V3 provided, please do not connect VDD_3V3. You only need 4 wires (3 signals and Ground)

The following procedures can be verified from RB8762CEVK (RB8762CMB + RB8762CHM). The difference is using RB8762CHM into RB8762CMB and the other is Using RB8762C module wired into RB8762CMB.

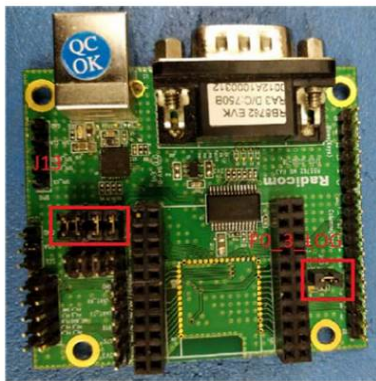
4.

Download image with BeeMPTool2.0.5

4.1 RB8762C EVK

4.1.1 Choose interface

We use USB interface to download the image. Please plug on USB cable to USB Connector and insert a 4 piece jumper into J13 (as below).



※The actual data transportation is USB to UART Bridge Virtual COM Port for this Usage. Please download CP2102 USB drive from below link:

<http://www.silabs.com/products/mcu/pages/usbtouartbridgevcpdrivers.aspx>

4.1.2

(Write down RB8762C BD address before the following steps.)

Before power on RB8762CMB, please pull high P0_3_LOG (can use a jumper as bellow), then power on and last for 15 seconds. The purpose of this step is to make RB8762C “Not execute” firmware. Connect P0_3_LOG to VDD_3V3 for over 15 seconds to erase the firmware of RB8762C.

Once you erase the firmware code, the module will lose the code forever until you download new code again. Please use RB8762CEVK (RB8762CMB + RB8762CHM) to get confidence on the procedures of Erasing and Downloading new firmware first.



4.1.3

Operating Steps:

- a. P3_0 jumper ON
 - b. Power ON
 - c. Wait for at least 15 seconds
 - d. Burn Image (Steps 4.1.4 to step 9)
 - e. Power OFF
 - f. P3_0 Jumper OFF
 - g. Use Cell phone (Android or iOS) to check Bluetooth device.
- You can verify the Bluetooth address to identify newly update.

4.1.4

Power on the RB8762CMB with your PC or notebook.

4.1.5

Execute "BeeMPTool2.0.5\BeeMpTool.exe"

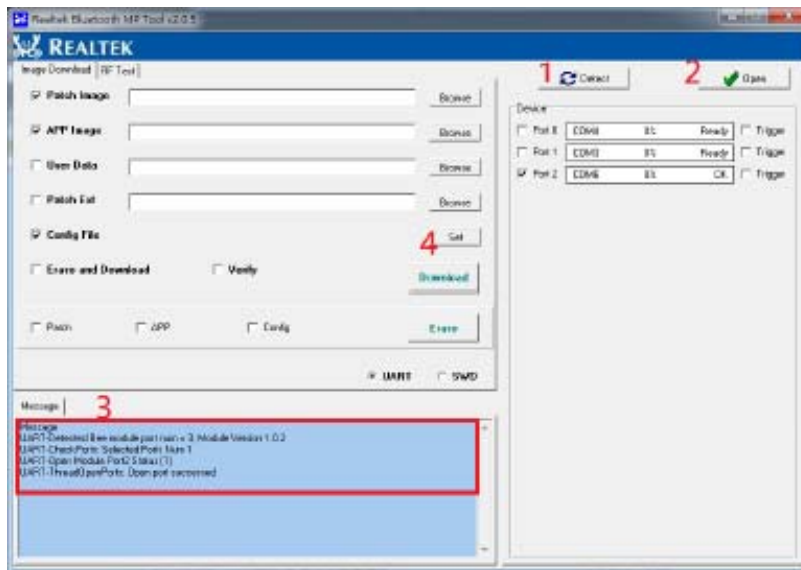
4.1.6

Step 1: Detect the RB8762CMB USB COM port at your PC or notebook

Step 2: Open it

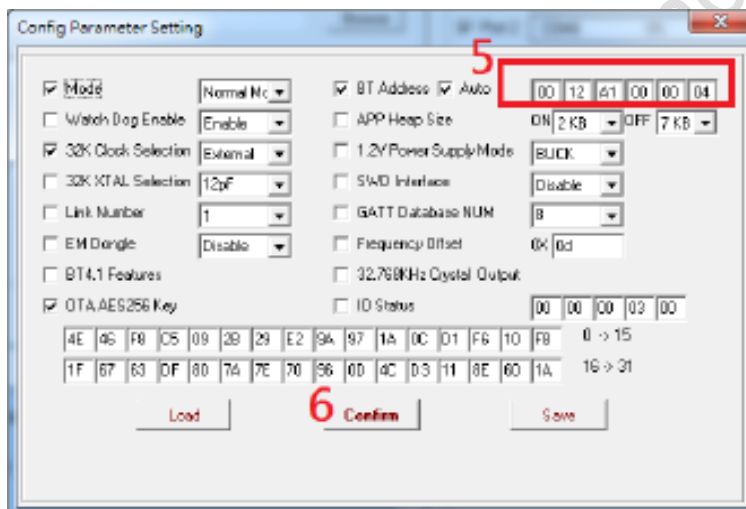
Step 3: Check the status

Step 4: Set configs



Step 5: After Click on Set Config file, you can set your BT address of new firmware.
You can check BT address after successfully update the firmware (from cellular phone)

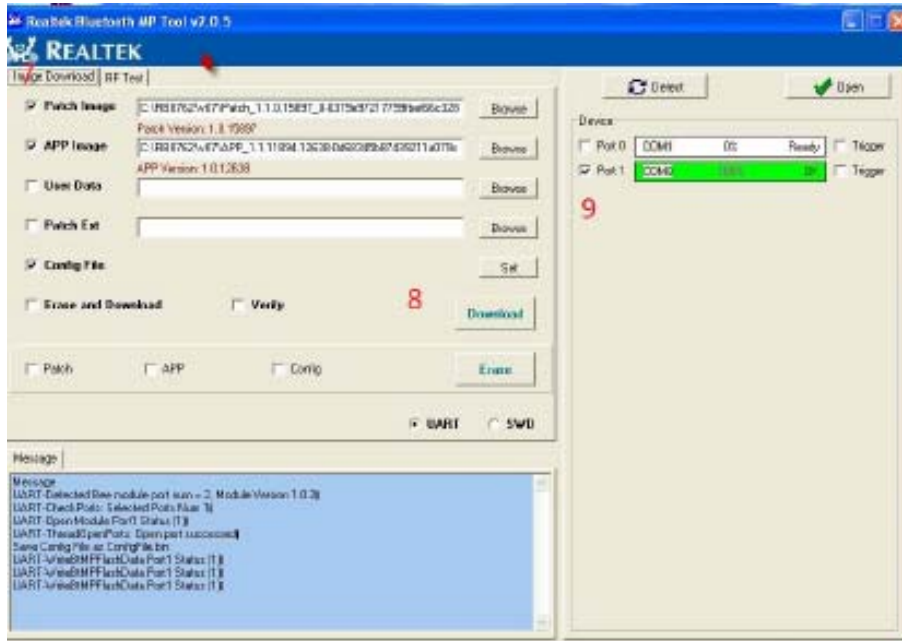
Step 6: Confirm then close this window



Step7: Select "Patch Image" and "APP Image"

Step8: Download successfully

Step9: Finished and close this window.



Power off RB8762C EVK then power on. The RB8762CEVK will be with the new image.

Summary of operating Steps:

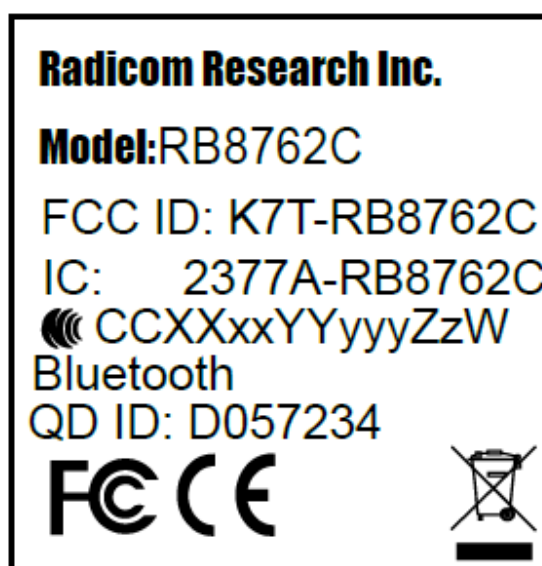
- a. P3_0 jumper ON
- b. Power ON
- c. Wait for at least 15 seconds to erase firmware.
- d. Burn Image (Steps 4.1.4 to Step 9)
- e. Power OFF
- f. P3_0 Jumper OFF
- g. Use Cell phone (Android or iOS) to check Bluetooth device.

You can verify the Bluetooth address to identify newly update.

FCC , IC, NCC Label and Model Identification

The RB8762C module family is FCC Part 15 and IC (Industry Canada) certified. The RB8762C is a

ISO CE marked. The modules are labeled with the RB8762C module model number and FCC Part 15 ID, IC registration number and CE mark. The label can be found on top of the metal shielding on the RB8762C Module.



Note: Models RB8762CHM will have an additional Product ID label containing the HM model number.



Important Regulatory Compliance and User Information

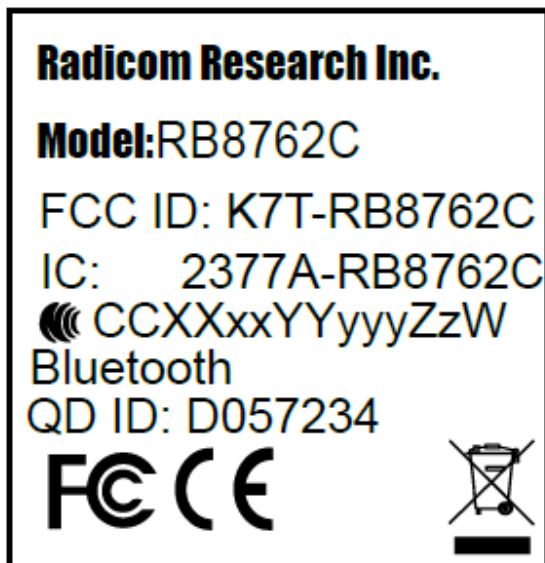
The final product with the modules installed needs to be tested for FCC Part 15, IC (Industry Canada) CE, EMI/RFI compliance. Radicom certification documentation will help streamline the final product approval process. Contact Radicom for more information. To maintain compliance in the finished product, carefully follow guidelines in this section. This device is intended only for OEM integrators under the following condition:

The transmitter module may not be co-located with any other transmitter or antenna. As long as this condition is met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end product for any additional compliance requirements required with the module installed (for example, digital device emissions, PC RB8762CJF Designer's Guide (RRD2Z50-20190314001-A09-C2)

peripheral requirements, etc).

IMPORTANT NOTE: In the event that this condition cannot be met then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Radicom Research Inc. Confidential



Host (End Product) Labeling Requirements

To maintain compliance, the end product hosting the module must be properly labeled to identify that this module is installed. The final end product must have a label located in a visible area with the following information:

XXXXXXXX is for the model of the module used in the end equipment. The XXXXXXXX will be RB8762C, RB8762CHM. The label shall be securely affixed to a permanently attached part of the device, in a location where it is visible or easily accessible to the user, and shall not be readily detachable. The label shall be sufficiently durable to remain fully legible and intact on the device in all normal conditions of use throughout the device's expected lifetime. These requirements may be met either by a separate label or nameplate permanently attached to the device or by permanently imprinting or impressing the label directly onto the device. The label text shall be legible without the aid of magnification, but is not required to be larger than 8-point font size.

End User Information

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF Exposure compliance. The end user should NOT be provided any instructions on how to remove or install the device. The user's manual for end users must include the following information in a prominent location.

FCC RF Radiation Exposure Statement

IMPORTANT NOTE: To comply with the FCC RF exposure compliance requirements, this device must not be co-located or operating in conjunction with any antenna or transmitter. This device contains a low power transmitter. When this device is operational, use only with the supplied, or recommended antenna. Unauthorized antenna, modification, or attachments could damage the transmitter and may violate FCC regulations. Changes or modifications not expressly approved by the manufacturer or party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement

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

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

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 and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. 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 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 assistance.

IC (Industry Canada) Statement:

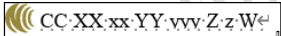
"This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device"

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit

pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement.

NCC:

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

安裝該模組之主體裝置或設備上必須標示『內含發射器模組』：

FCC:

RF exposure warning

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance. The final end product must be labeled in a visible area with the following: "Contains FCC ID: K7T-RB8762C and "Contains IC: 2377A-RB8762C “

OEM Integration Instructions :

This device is intended only for OEM integrators under the following conditions :

The module can be used to installation in other host. The antenna(s) used for this transmitter must be installed to the provided separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. The module shall be only used with the integral antenna(s) that has been originally tested and certified with this module.

As long as 3 conditions above are met, further transmitter test will not be required.

However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirement with this module installed (for example, digital device emission, PC peripheral requirements, etc.)

IC:

Radio Frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Industry Canada (IC) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has also been evaluated and shown compliant with the IC RF Exposure limits under mobile exposure conditions. (antennas are greater than 20cm from a person's body).

Informations concernant l'exposition aux fréquences radio (RF)

La puissance de sortie émise par l'appareil de sans fil est inférieure à la limite d'exposition aux fréquences radio d'Industry Canada (IC). Utilisez l'appareil de sans fil de façon à minimiser les contacts humains lors du fonctionnement normal.

Ce périphérique a également été évalué et démontré conforme aux limites d'exposition aux RF d'IC dans des conditions d'exposition à des appareils mobiles (antennes sont supérieures à 20 cm à partir du corps d'une personne).

This radio transmitter IC: 2377A-RB8762C has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Le présent émetteur radio [identifier le dispositif par son numéro de certification d' ISDE] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Radicom	RB8762C	PCB	-0.5dBi
2	BRITO TECHNOLOGY	WF1DI-2AB(C)	Dipole	2.0dBi

CE Declaration of Conformity


For the following equipment:

Radicom Research, Inc. Bluetooth Module

Model(s): RB8762C, RB8762CHM

are herewith confirmed to comply with the requirements set out in the Council (European parliament) Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility of Radio and Telecom device (2014/53/EU). For the evaluation regarding this Directive, the following standards were applied:

EN 61000-4-2:2010, EN 300 328 V2.1.1:2016, EN 62311: 2008,
EN 61000-4-3:2010, EN 301 489-17 V2.1.1: 2009-05, EN301 489-1 V1.92,
EN 60950-1:2006+A11:2009+A1: 2010+A12:2011,

This equipment is marked with  and can be used throughout the European community.

France – 2.4GHz for Metropolitan France:

In all Metropolitan departments, wireless LAN frequencies can be used under the following conditions, either for public or private use:

- Indoor use: maximum power (EIRP*) of 100 mW for the entire 2400-2483.5 MHz frequency band
- Outdoor use: maximum power (EIRP*) of 100 mW for the 2400-2454 MHz band and with maximum power (EIRP*) of 10 mW for the 2454-2483 MHz band

Europe – R&TTE Compliance Statement:

Hereby, Radicom Research Inc. declares that this equipment complies with the essential requirements and other relevant provisions of LVD 2014/53/EU and EMC 2014/30/EU OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of April 14, 2014 on Radio Equipment Directive (RED) 2014/53/EU and the mutual recognition of their conformity.

Limited Warranty

Warranty Coverage and Duration

Radicom Research, Inc. (“RRI”) warrants to the original purchaser its RRI-manufactured products (“Product”) against defects in material and workmanship under normal use and service for a period of one year from the date of delivery. During the applicable warranty period, at no charge, RRI will, at its option, either repair, replace or refund the purchase price of this Product, provided it is returned in accordance with the terms of this warranty to RRI. Repair, at the option of RRI, may include the replacement of parts, boards or other components with functionally equivalent reconditioned or new parts, boards or other components. Replaced parts, boards or other components are warranted for the balance of the original applicable warranty period. All replaced items shall become the property of RRI.

RRI MAKES NO GUARANTEE OR WARRANTY THAT THE PRODUCT WILL PREVENT OCCURRENCES, OR THE CONSEQUENCES THEREOF, WHICH THE PRODUCT IS DESIGNED TO DEFECT.

This expressed limited warranty is extended by RRI to the original end-user purchaser only, and is not assignable or transferable to any other party. This is the complete warranty for the Product manufactured by RRI, and RRI assumes no obligation or liability for additions or modifications to this warranty. In no case does RRI warrant the installation, maintenance or service of the Product. RRI is not responsible in any way for any ancillary equipment not furnished by RRI that is attached to or used in connection with the Product, or for operation of the Product with any ancillary equipment and all such equipment is expressly excluded from this warranty. Because of wide variations in topographical and atmospheric conditions, which may require availability of repeater stations or of particular radio frequencies, RRI assumes no liability for range, coverage or suitability of the Product for any particular application. Buyer acknowledges that RRI does not know a particular purpose for which buyer wants the Product, and that buyer is not relying on RRI’s skill and judgment to select or furnish suitable goods.

What this Warranty does NOT Cover:

1. Defects or damage resulting from use of the Product in other than its normal and customary manner.
2. Defects or damage from misuse, accident or neglect.
3. Defects of damage from improper testing, operation, maintenance, installation, alteration, modification or adjustment.
4. Disassembly or repair of the Product in such a manner as to adversely affect performance or prevent adequate inspection and testing to verify any warranty claim.
5. Any Product that has had its serial number or date code removed or made illegible.

How to Receive Warranty Service:

To obtain warranty service, contact RRI by phone (408) 383 9006 for RMA Department and RMA (Return Merchandise Authorization) number. Deliver or send the Product, transportation and insurance prepaid to RRI, with the RMA number clearly marked on the outside of the package.

General Provision

This warranty sets forth the full extent of RRI's responsibilities regarding the Product. Repair, replacement or refund of the purchase price, at RRI's option, is the exclusive remedy. THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER EXPRESSED WARRANTIES. ANY APPLICABLE IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTY OF MERCHANTABILITY, ARE LIMITED TO THE DURATION OF THIS LIMITED WARRANTY. TO THE FULLEST EXTENT PERMITTED BY LAW, RRI DISCLAIMS ANY LIABILITY FOR DAMAGES IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT, FOR ANY LOSS OF USE, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, LOST PROFITS OR SAVING OR OTHER INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE OR FAILURE OF SUCH PRODUCT.

Contacting Radicom Research

If more information or technical support is needed, please contact us:



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