

Radicom Research, Inc.

*Preliminary Designer's Guide
for the*

RB8762

(RoHS BLE4.2 Serial Bluetooth Modules)

and

RB8762EVK Evaluation Kit



RB8762-a

RB8762-c



RoHS Compliant



November 16, 2016

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Introduction

Thank you for choosing Radicom RB8762 Module. We are committed to providing you quality service and technical support. The RB8762 modules are designed to meet OEM's needs of embedding low power, wireless data connectivity to their products. The RB8762 family offers a quick and simple solution for wireless Bluetooth communications.

The Radicom RB8762 module is designed to meet the emerging market for Bluetooth 4.2 applications. These embedded Bluetooth 4.2 modules integrate entire profiles, applications, and Bluetooth protocol stack, so no external processor is needed. The module contains an internal S-Flash so custom parameters and settings can be easily loaded into these modules.

The RB8762 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 4.0 Bluetooth device or for help in determining which Bluetooth Module is the best fit for your particular Bluetooth application.

The RB8762 family modules can be powered with standard 3V3 low power. In lowest mode it consumes only uA level power and will wake up in few hundred microseconds. The RB8762 family provides superior performance in the presence of interference from 802.11 (WiFi) wireless devices and other 2.4GHz radios.

The RB8762 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 RB8762 is available in surface mount (SMD) or through-hole (Dip) hardware designs. The RB8762 module is the surface mount model. The RB8762 can also be mounted on a conversion board to create the RB8762HM model for serial through-hole designs.

RB8762EVK and BLE Functionality

Radicom provides RB8762EVK Development Kits to provide a quick platform for testing and evaluating the RB8762 and RB8762HM Bluetooth modules. The kit includes two RB8762 modules mounted on the RB8762HM Dip Module. Each RB8762HM is installed into a RB8762MB evaluation board. One of the RB8762HM is configured to operate in BLE Data Protocol Master mode. The other RB8762HM is configured to operate in BLE Data Protocol Slave mode. The RB8762MB boards have an RS232 Serial Port Connector that allows the user to immediately connect to any standard serial port to evaluate the Bluetooth modules.

The RB8762 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 RB8762-S advertises or broadcasts the Bluetooth signal. The Master Model RB8762-M will scan for Bluetooth signals and then request a Bluetooth connection. The RB8762-S Slave can then accept the connection for BLE Data transfers. The RB8762-S Slave can also operate with remote devices that also support the BLE Data Protocol.

Features

- Support the Bluetooth 4.2 core specification
- Frequency Range 2.402 – 2.480 GHz
- Integrate MCU to execute Bluetooth protocol stack
- Ultra low power consumption with intelligent PMU
- Supports Host and Client 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: -1 ± 2 dBm Max ~ RX Sensitivity: -92.5 dBm 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
- Support AES128/192/256 encrypt/decrypt engine
- Serial Interface (SPI / I²C / PWM)
- Support 3wire/2wire SPI
- Wake-up interrupt
- Watch Dog Timer
- Small sizes: RB8762 ~ 0.67” x 0.59”
RB8762HM ~ 0.67” x 1.09”
- On-board microprocessor, RAM and ROM
- On-board antenna or on-board U.FL connector for external antenna
- -20°C to $+85^{\circ}\text{C}$ temperature operating

Approvals (pending)





- RoHS Compliant

Electronic Characteristics

	Minimum	Typical	Maximum	Unit
Operation voltage	2.35	3.3	3.6	V
Output Power			0	dBm
Sensitivity	-92.5			dBm
Current Consumption *				
Pairing mode		4.4		mA
RX active		616		uA

* The Current Consumption is code dependent. Bluetooth functions and characteristics will vary depending on the application firmware that is loaded into the RB8762 module. The standard code is for BLE Slave. Using any RB8762 I/O (output) will draw more current and change the overall current consumption.

Model and Ordering Information

Model Numbers	Description
<p>RB8762G-a-G , RB8762J-a-G , RB8762R-a-G , RB8762K-a-G , RB8762G-a , RB8762J-a , RB8762R-a , RB8762K-a , RB8762G , RB8762J , RB8762R , RB8760K ,</p> 	<p>Surface mount RB8762 Bluetooth module with on-board antenna.</p>
<p>RB8762G-c-G , RB8762J-c-G , RB8762R-c-G , RB8762G-c-G RB8762K-c-G , RB8762G-c , RB8762J-c , RB8762R-c , RB8762K-c , RB8762G , RB8762J , RB8762R , RB8760K ,</p> 	<p>Surface mount RB8762 Bluetooth module with on-board U.FL connector for external antenna.</p> <p>Models: RB8762-c-S with Slave Code RB8762-c-M with Master Code</p>
<p>RB8762G , RB8762J , RB8762R , RB8760K , RB8762-c-HM, RB8762-c-HMG , RB8762-a-HM , RB8762-a-HMG</p> 	<p>Dual-in-line, through-hole Bluetooth module. RB8762 mounted on Half Inch PCB for DIP (through-hole) interface.</p> <p style="text-align: center;">e</p>
<p>RB8762MB</p> 	<p>Base board for RB8762HM plug-in and easy implementation. This base board provides interface connectors as.....</p> <p>Models: RB8762MBR with RS232 interface RB8762MBU with USB interface</p>

RB8762EVK



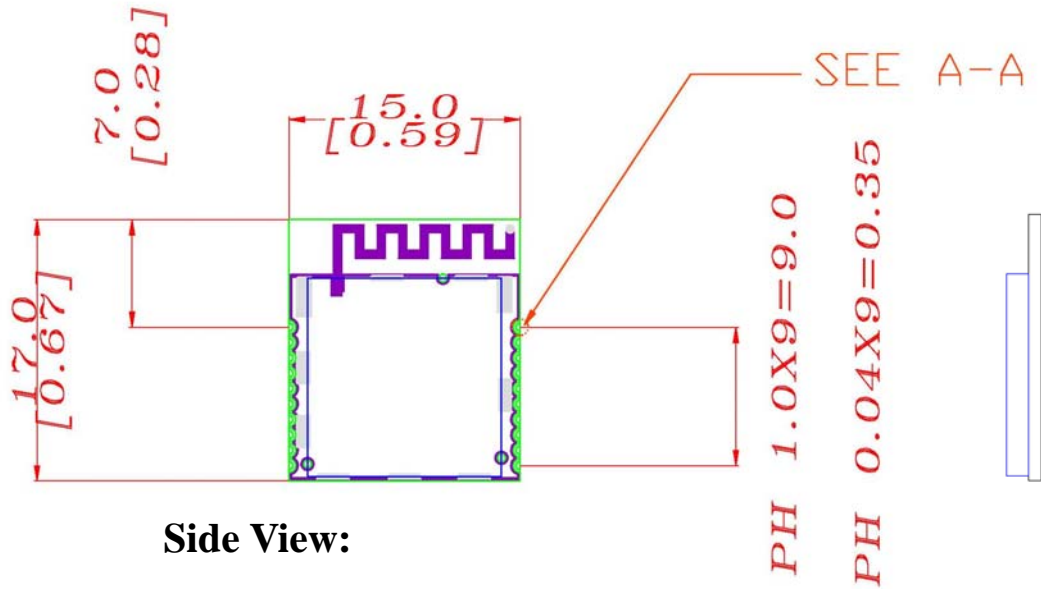
RB8762EVK Evaluation Kit. Each kit consists of the following components:

1. 1ea RB8762HM through-hole (DIP) module
2. 1ea RB8762MBR or RB8762MBU Base Board
3. 1ea 6 feet USB Power cables (A to B)
4. 1ea 6 feet null modem cables (DB9F to DB9F)
5. 1ea SMA antenna and U.FL connector antenna cable (optional accessories for –c external antenna models)

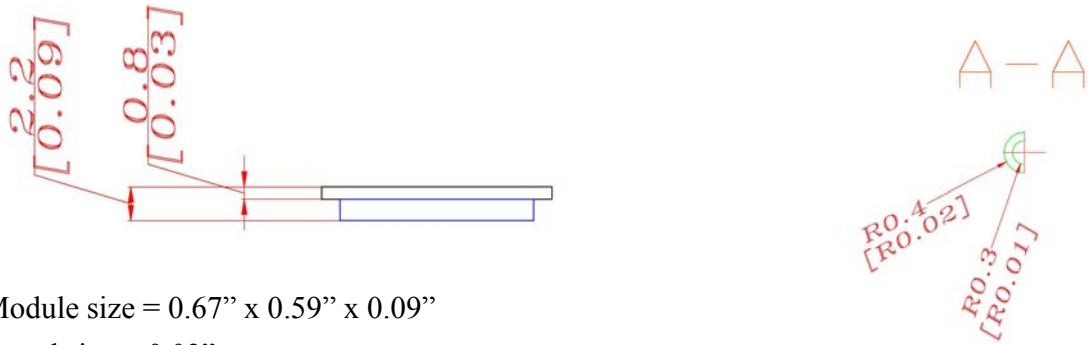
RB8762 Module Mechanical Dimensions & Pin Definitions

Top View:

Unit: mm[inch]



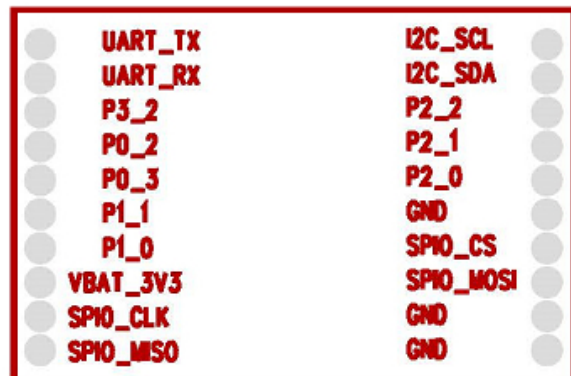
Side View:



Module size = 0.67" x 0.59" x 0.09"

Board size = 0.03"

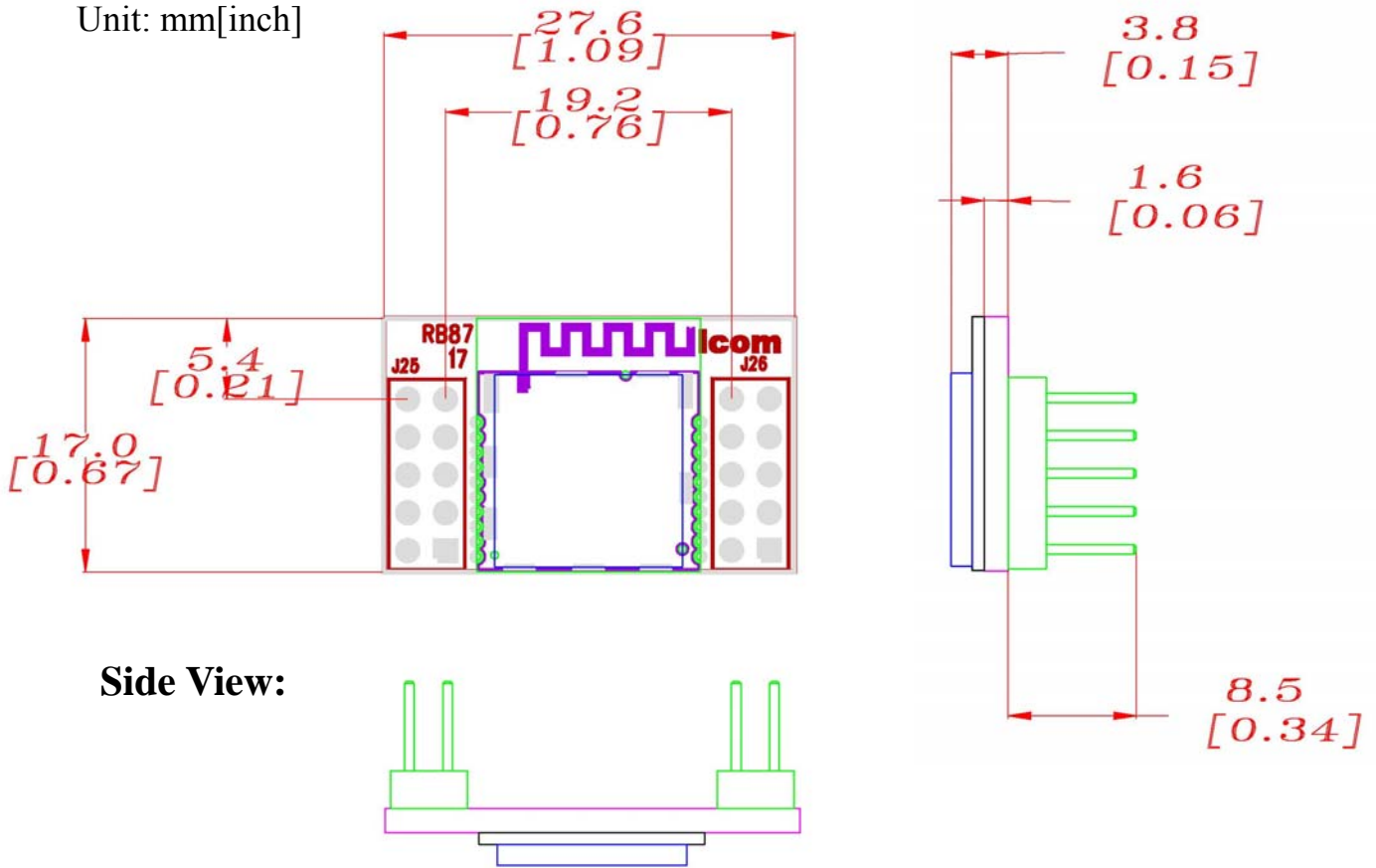
Pin Definitions:



RB8762-HM Mechanical Dimensions & Pin Definitions

Top View:

Unit: mm[inch]

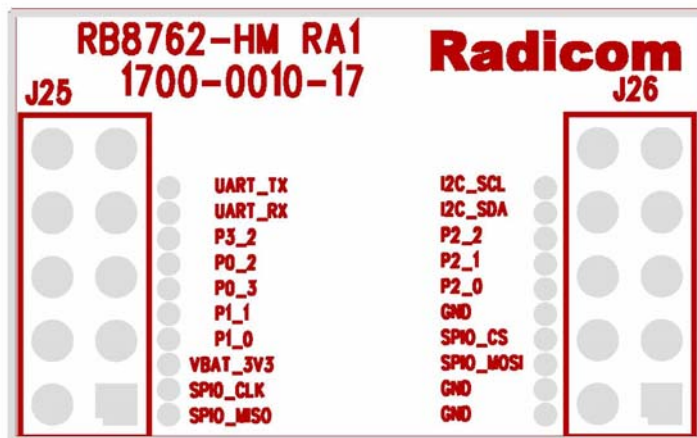


Side View:

RB8762HM size = 0.67" x 1.09" x 0.15" (without pin header height)

Pin header pitch = 2.54mm

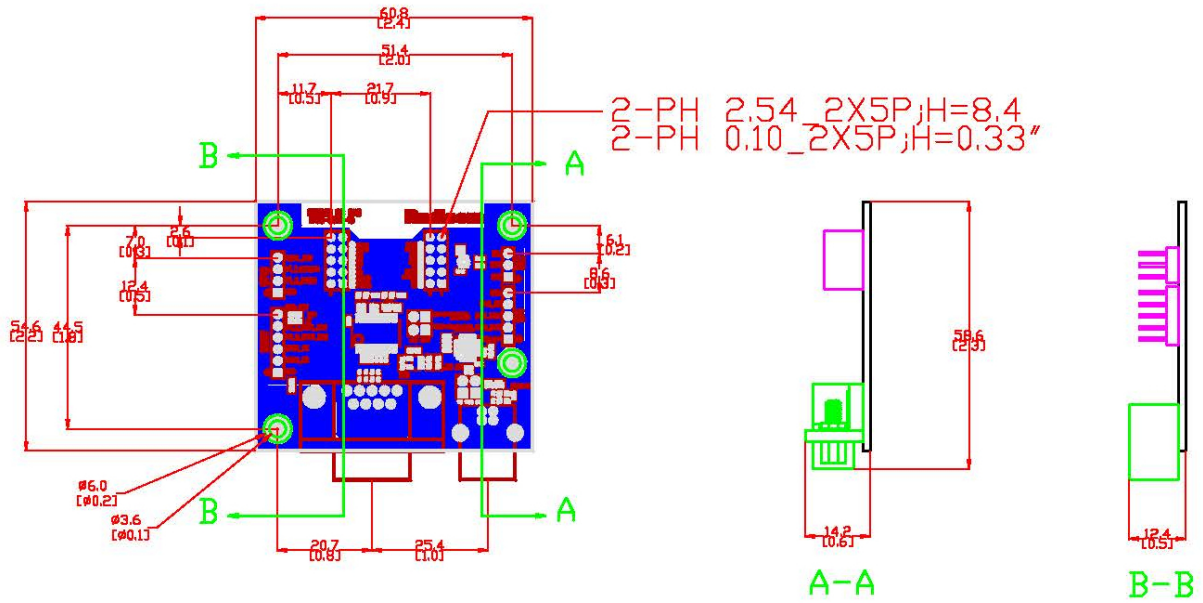
Pin Definitions:



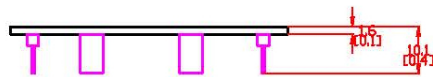
RB8762MB Mechanical Dimensions

Top View:

Unit: mm[inch]



Side View:



Evaluation Board size = 2.2" x 2.4" x 0.4"

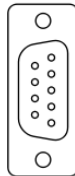
RB8762MB RS232 DB9 Pin Definitions

The pin definitions of DB9 used on the RB8762MB RS232 Serial Connector are as follows:

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



6 DSR
7 RTS
8 CTS
9 RI



1 CD
2 RXD
3 TXD
4 DTR
5 GND

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:**

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

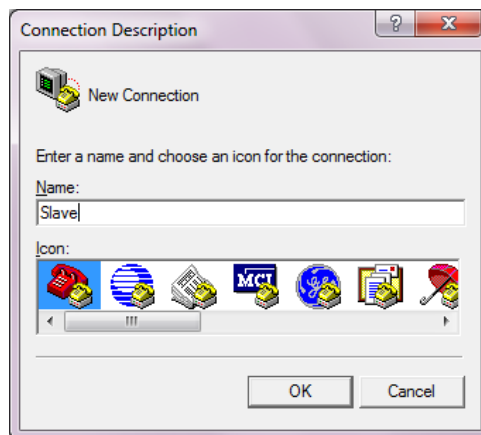
Operating RB8762MB

Introduction - Radicom provides RB8762MB Development Kit to provide a quick platform for testing and evaluating the RB8762HM Bluetooth module. Each RB8762MB has an USB connector for providing power and also for UART interface. Through this USB-UART interface you can issue AT commands to instruct the modules to establish a Bluetooth connection to transmit and receive data.

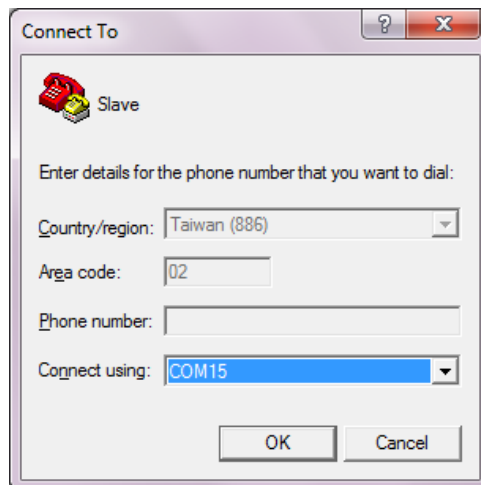
Hardware Set-up - To provide power to the RB8762MB, plug one end of the USB cable into USB connector on the RB8762MB. Plus the other end into the PC USB port.

PC Set-up - Turn on the PC. To send the AT commands and transmit & receive data with the RB8762MB use a serial communication package such as HyperTerminal. Set the appropriate COM port for each side with the DTE speed set to 115200 and parity set to 8N1.

Step 1: Hyper terminal setting is as follows:

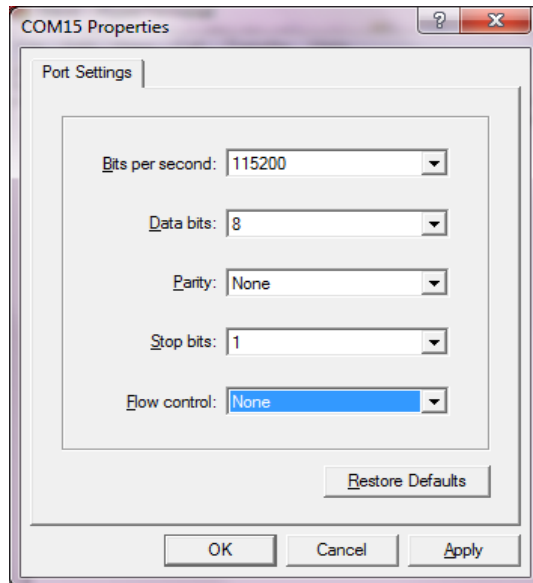


Step 2: Choose the appropriate COM port.



Step 3: COM Properties:

Baud rate: 115200, 8 data bits, None parity, 1 stop bits and None flow control.



Step 4: Click OK button to complete the settings.

Set-Up verification – Issue atbp-v in hyper terminal. If RB8762MB is properly setup, you will see the device information, such as product name, manufacturer name, firmware version and BD address.

Supported AT Command List –

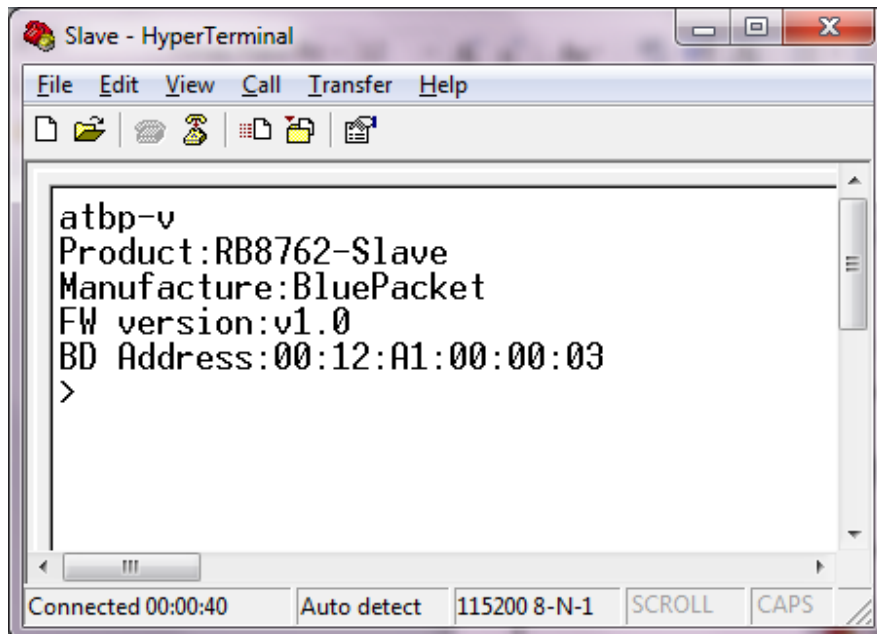
AT Commands	Slave Side	Master Side	Description
atbp-v	√	√	Get device information
atbp-a	√	Invalid	Advertising On
atbp-otaOn	Invalid	√	OTA mode On
atbp-otaOff	Invalid	√	OTA mode Off
scan	Invalid	√	Scanning On
stopscan	Invalid	√	Scanning Off
rembd x11 x22 x33 x44 x55 x66	Invalid	√	To remember the BD address. 11/22/33/44/55/66 is the device BD address you wish to connect.
con	Invalid	√	Connect a Slave device
rssiread	Invalid	√	Read Slave device RSSI
disc	Invalid	√	Disconnect a Slave device

Note: Upper case or lower case sensitive.

RB8762-Slave Operations:

Step 1:

atbp-v: get device information

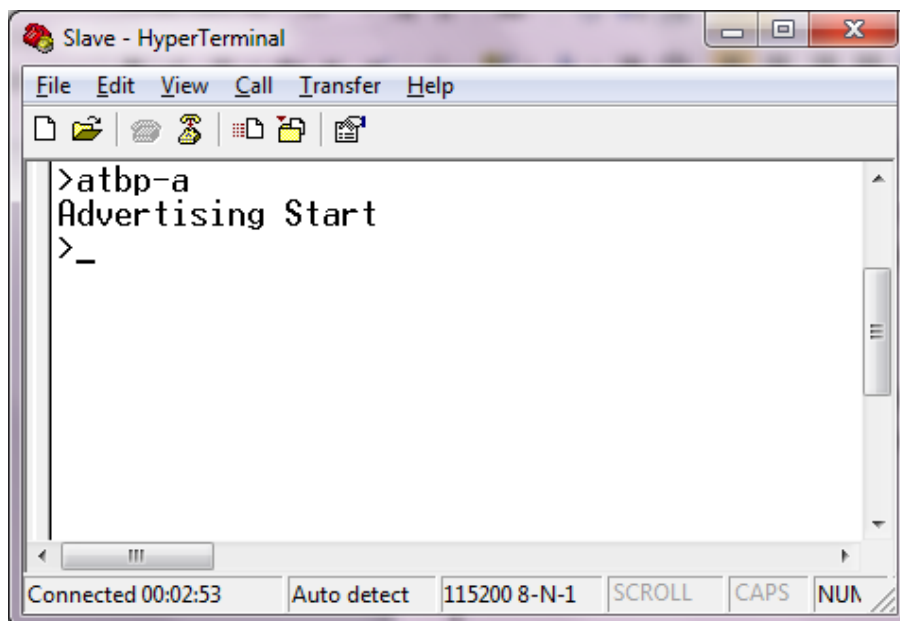


```
Slave - HyperTerminal
File Edit View Call Transfer Help
atbp-v
Product:RB8762-Slave
Manufacture:BluePacket
FW version:v1.0
BD Address:00:12:A1:00:00:03
>
```

Connected 00:00:40 Auto detect 115200 8-N-1 SCROLL CAPS

Step 2:

atbp-a: enter advertising mode



```
Slave - HyperTerminal
File Edit View Call Transfer Help
>atbp-a
Advertising Start
>_
```

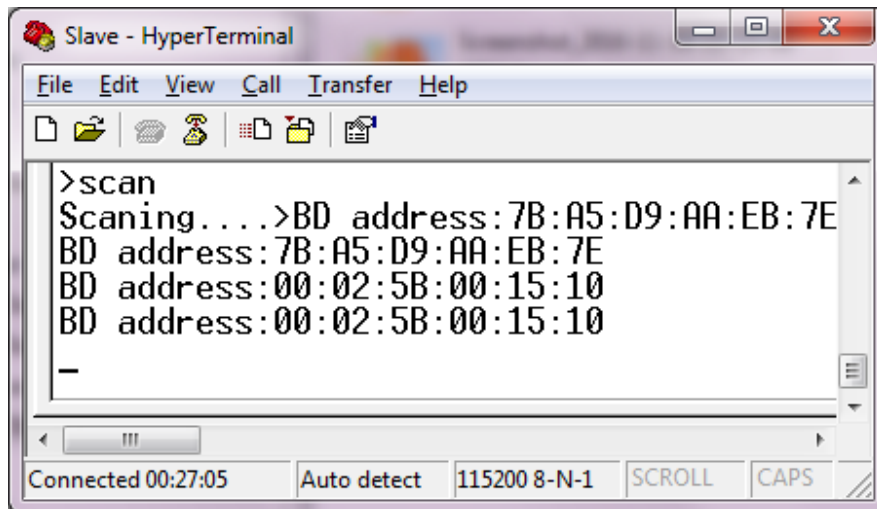
Connected 00:02:53 Auto detect 115200 8-N-1 SCROLL CAPS NUM

Step 3: When RB8762-Slave enters advertising mode, it can be connected by a BLE Master, i.e. RB8762-Master.

RB8762-Master Operations:

Step 1:

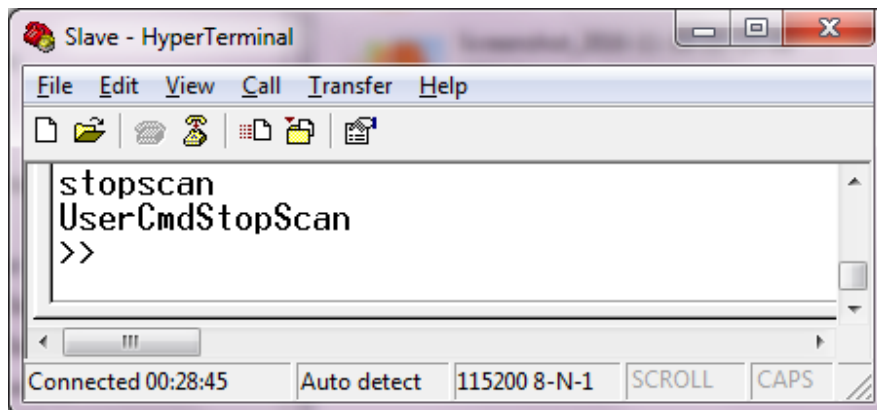
scan: enter scan mode.



A screenshot of a HyperTerminal window titled "Slave - HyperTerminal". The window has a menu bar with "File", "Edit", "View", "Call", "Transfer", and "Help". Below the menu bar is a toolbar with icons for file operations and communication. The main text area shows the following text:
>scan
Scanning...>BD address:7B:A5:D9:AA:EB:7E
BD address:7B:A5:D9:AA:EB:7E
BD address:00:02:5B:00:15:10
BD address:00:02:5B:00:15:10
-
At the bottom of the window, there is a status bar with the text "Connected 00:27:05", "Auto detect", "115200 8-N-1", "SCROLL", and "CAPS".

Step 2:

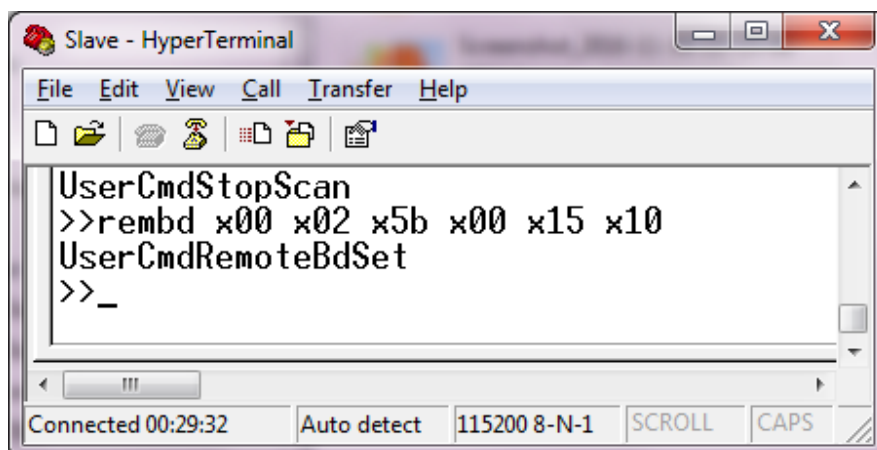
stopscan: once the device BD address is shown, please stop scan mode.



A screenshot of a HyperTerminal window titled "Slave - HyperTerminal". The window has a menu bar with "File", "Edit", "View", "Call", "Transfer", and "Help". Below the menu bar is a toolbar with icons for file operations and communication. The main text area shows the following text:
stopscan
UserCmdStopScan
>>
At the bottom of the window, there is a status bar with the text "Connected 00:28:45", "Auto detect", "115200 8-N-1", "SCROLL", and "CAPS".

Step 3:

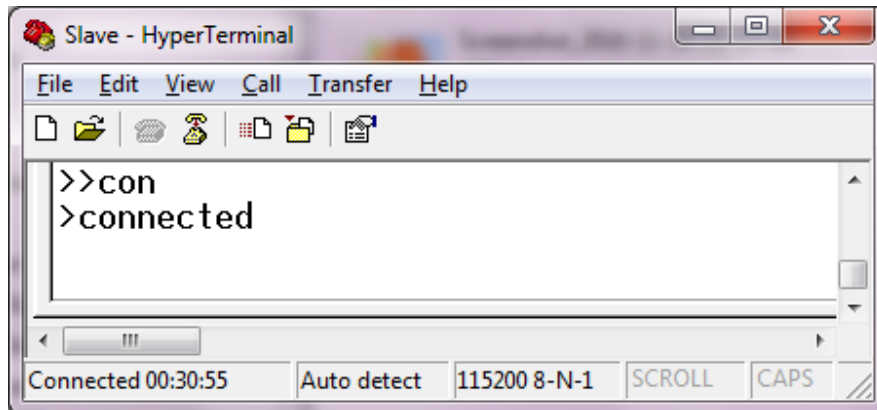
rembd x00 x02 x5b x00 x15 x10: to remember the device BD address.



A screenshot of a HyperTerminal window titled "Slave - HyperTerminal". The window has a menu bar with "File", "Edit", "View", "Call", "Transfer", and "Help". Below the menu bar is a toolbar with icons for file operations and communication. The main text area shows the following text:
UserCmdStopScan
>>rembd x00 x02 x5b x00 x15 x10
UserCmdRemoteBdSet
>>_
At the bottom of the window, there is a status bar with the text "Connected 00:29:32", "Auto detect", "115200 8-N-1", "SCROLL", and "CAPS".

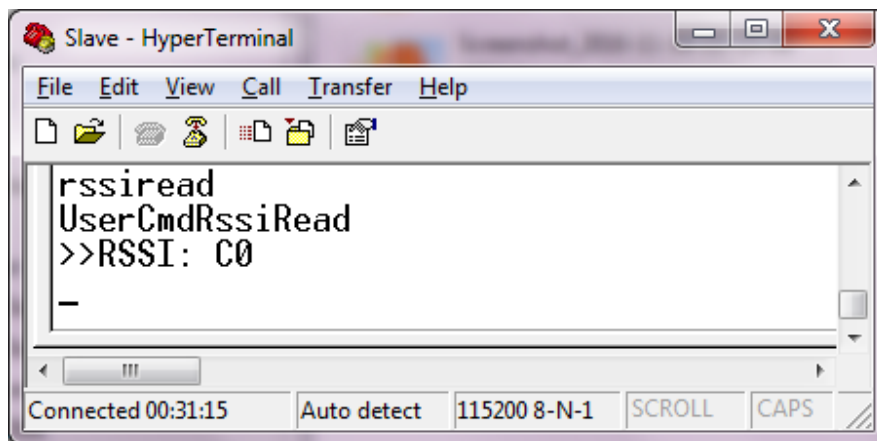
Step 4:

con: connect the device.



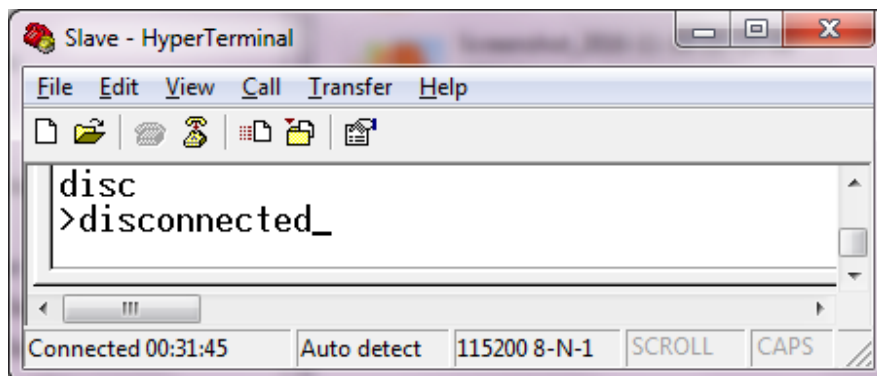
Step 5:

rssiread: to read the device RSSI value.



Step 6:

disc: to disconnect the device.

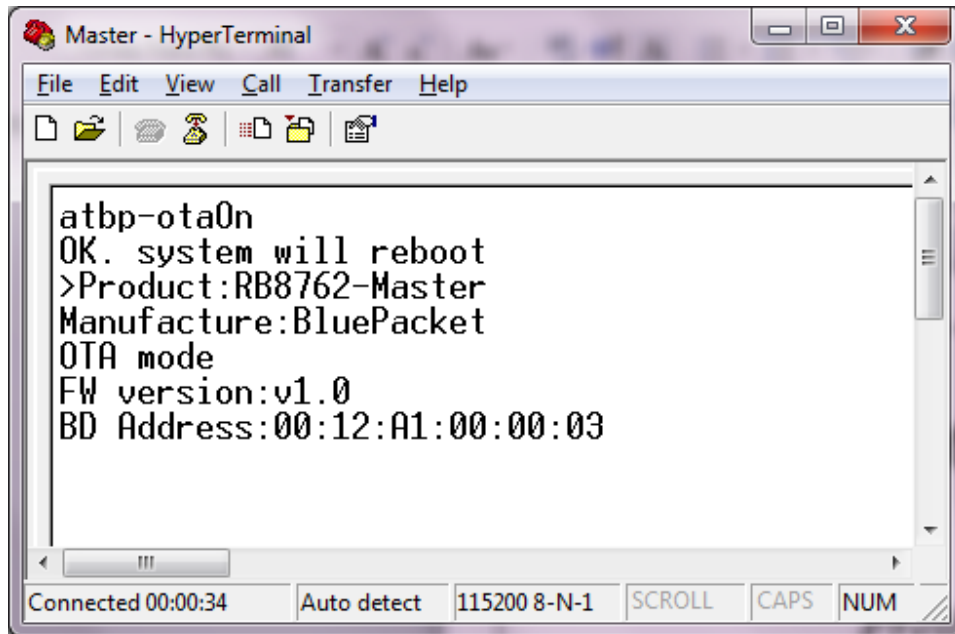


OTA Upgrading Firmware

Operating steps:

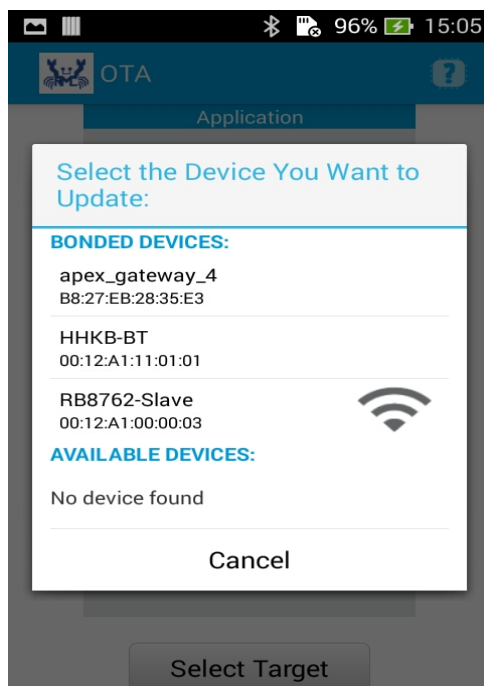
1. Plug in USB cable to power on RB8762MB.
2. Issue atbp-otaOn to enter OTA mode in RB8762-Master side.

Note: Skip this process if you're using RB8762-Slave.

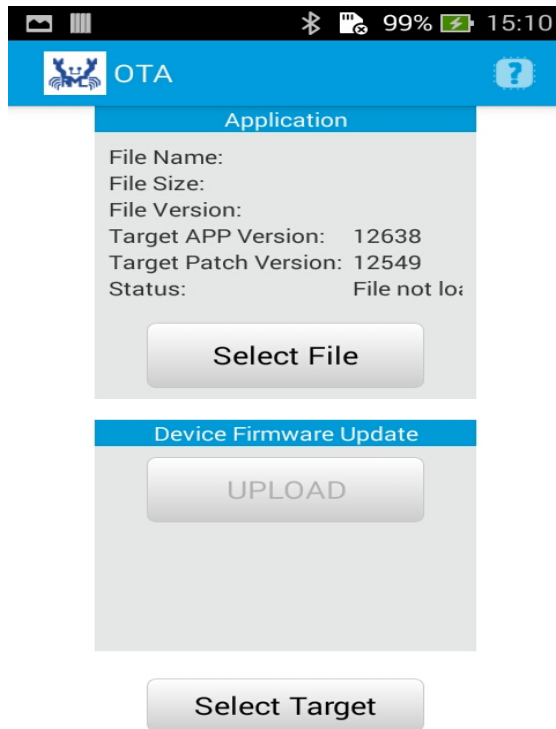


```
Master - HyperTerminal
File Edit View Call Transfer Help
atbp-otaOn
OK. system will reboot
>Product:RB8762-Master
Manufacture:BluePacket
OTA mode
FW version:v1.0
BD Address:00:12:A1:00:00:03
Connected 00:00:34 Auto detect 115200 8-N-1 SCROLL CAPS NUM
```

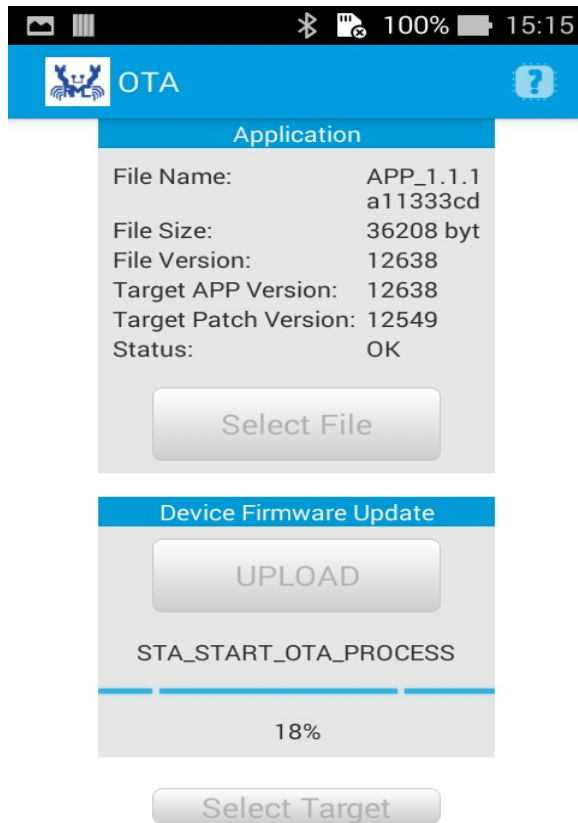
3. Install OTA APP in your smart phone (please contact manufacturer for Android or iOS APP).
4. Launch the OTA APP and search for the RB8762 device name. The device name is either “RB8762-Master” or “RB8762-Slave”.



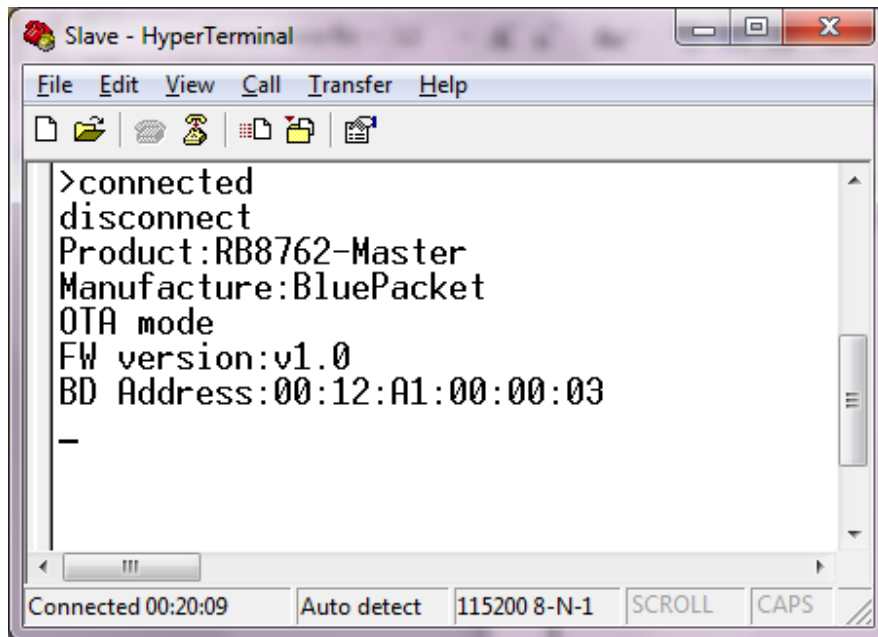
5. Save the new firmware file to your smart phone, and click “Select File” from APP. Click “UPLOAD”.



6. The firmware upgrade will start immediately, and it will take approximately 40 seconds to complete an update.



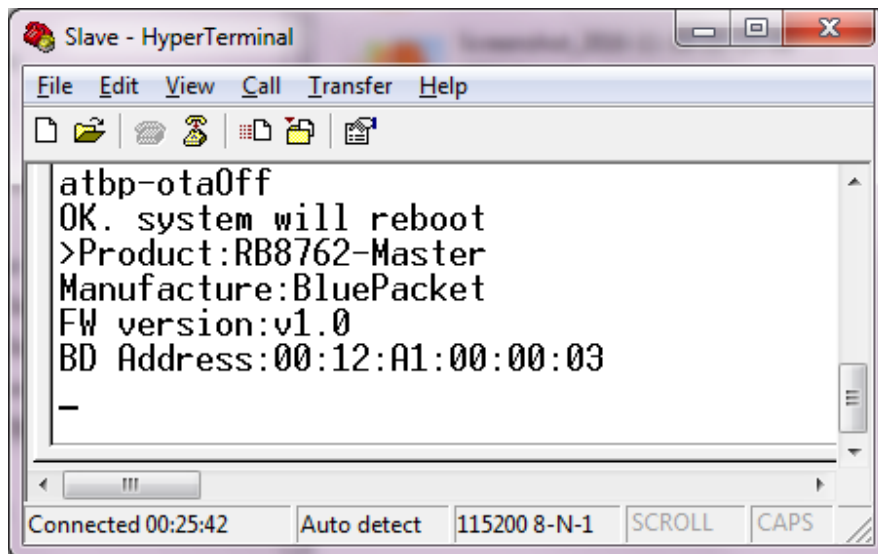
7. When new firmware upgraded successfully through OTA, you will see the new information shown on hyper terminal.



A screenshot of a HyperTerminal window titled "Slave - HyperTerminal". The window has a menu bar with "File", "Edit", "View", "Call", "Transfer", and "Help". Below the menu bar is a toolbar with icons for file operations. The main text area contains the following text:
>connected
disconnect
Product:RB8762-Master
Manufacture:BluePacket
OTA mode
FW version:v1.0
BD Address:00:12:A1:00:00:03
-
The status bar at the bottom shows "Connected 00:20:09", "Auto detect", "115200 8-N-1", "SCROLL", and "CAPS".

8. atbp-otaOff: Escape OTA mode in RB8762-Master side.

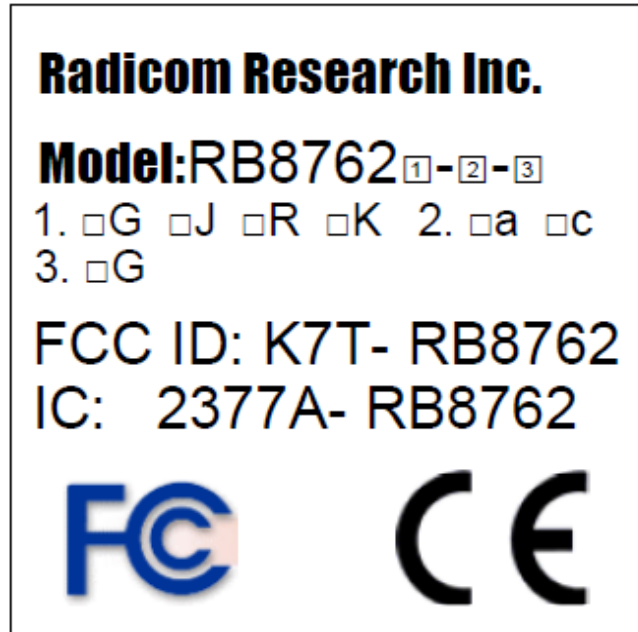
Note: Skip this process if you're using RB8762-Slave.



A screenshot of a HyperTerminal window titled "Slave - HyperTerminal". The window has a menu bar with "File", "Edit", "View", "Call", "Transfer", and "Help". Below the menu bar is a toolbar with icons for file operations. The main text area contains the following text:
atbp-otaOff
OK. system will reboot
>Product:RB8762-Master
Manufacture:BluePacket
FW version:v1.0
BD Address:00:12:A1:00:00:03
-
The status bar at the bottom shows "Connected 00:25:42", "Auto detect", "115200 8-N-1", "SCROLL", and "CAPS".

FCC & IC Label and Model Identification

The RB8762 module family is FCC Part 15 and IC (Industry Canada) certified. The RB8762 is also CE marked. The modules are labeled with the RB8762 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 RB8762 Module.



Note: Models RB8762 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 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.

Host (End Product) Labeling Requirements

The final end product must be labeled in a visible area with the following: "Contains TX FCC ID: K7T-RB8762".

RB8762 is for the model of the module used in the end equipment. The RB8762 will be RB8762x-x-x, RB8762-x-HM, and RB8762-x-HMG. 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.

d

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 radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CE Declaration of Conformity

For the following equipment:

Radicom Research Inc. Bluetooth Module

Model(s): RB8762, RB8762HM

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 (1999/5/CE). For the evaluation regarding this Directive, the following standards were applied:

EN 61000-4-2:2010, EN 300 328 V1.7.1:2006, EN 62311: 2008,
EN 61000-4-3:2010, EN 301 489-17 V2.1.1, 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 DIRECTIVE 1999/5/CE OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of March 9, 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE).

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:

- (a) Defects or damage resulting from use of the Product in other than its normal and customary manner.
- (b) Defects or damage from misuse, accident or neglect.
- (c) Defects of damage from improper testing, operation, maintenance, installation, alteration, modification or adjustment.
- (d) 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.
- (e) 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 or email to rma@radi.com for an 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

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