Radicom Research, Inc.

RB1000 , RB1000HM

& BPM1000FCE Serial

Bluetooth Modules

User's Manual

RB1000/BPM1000FCE

RB1000HM

RoHS Compliant

August 9, 2012

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Introduction

Thank you for choosing Radicom RB1000 family Module. We are committed to providing you quality service and technical support. The RB1000 modules are designed to meet OEM's needs of embedding short-range, low power, wireless data connectivity to their products. The RB1000 family offers a quick and simple solution for wireless Bluetooth communications.

The Radicom RB1000 family module is designed to meet the emerging market for Bluetooth 4.0 applications. These embedded Bluetooth 4.0 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 RB1000 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. The model RB1000-S can also be used to connect to other Bluetooth 4.0 devices such as a Bluetooth Dongle or PCs that support the Radicom BLE Data Protocol. Contact Radicom for help adding 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 RB1000 family modules can be powered directly with standard 3V coin cell or pair of AAA batteries. In lowest mode it consumes only 600nA and will wake up in few hundred microseconds. The RB1000 family provides superior performance in the presence of interference from 802.11 (WiFi) wireless devices and other 2.4GHz radios.

The RB1000 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 $1/20^{th}$ of the power of Bluetooth Basic Rate.

The RB1000 is available in surface mount (SMD) or through-hole (Dip) hardware designs. The RB1000 module is the surface mount model. The RB1000 can also mounted on a conversion board to create the RB100HM model for serial through-hole design

Approvals ~ Pending

- FCC Part 15: 47 CFR FCC Part 15
  Subpart C 15.247, 47 CFR FCC Part 15 Subpart B 2009 (Class B)
- IC RSS-102, IC ES-003 issue 4, IC RSS-210 issue 8:2010
- RoHS Compliant
- CE Marked: EN 61000-3-2:2006+A2:2009, EN 62311:2008, EN 300 328 V1.7.1,
  EN 301 489-1, V1.8.1, EN 61000-3-3:2008, EN 301 489-17 V2.1.1, EN301 489-1 V1.9.2), EN 62311:2008
  EN60950-1:2006+A11:2009+A1:2010+A12:2011

Electronic Characteristics

	Minimum	Typical	Maximum	Unit
Operation voltage	2.35	3.0	3.6	V
Output Power			4.0	dBm
Sensitivity	-92.5			dBm
Current Consumption				
Dormant mode, VBAT=3V			600	nA
Deep Sleep mode, VBAT=3V			5	uA
Idle mode, VBAT=3V		1		mA
RX/TX active, VBAT=3V		16		mA

Firmware Upgrade List

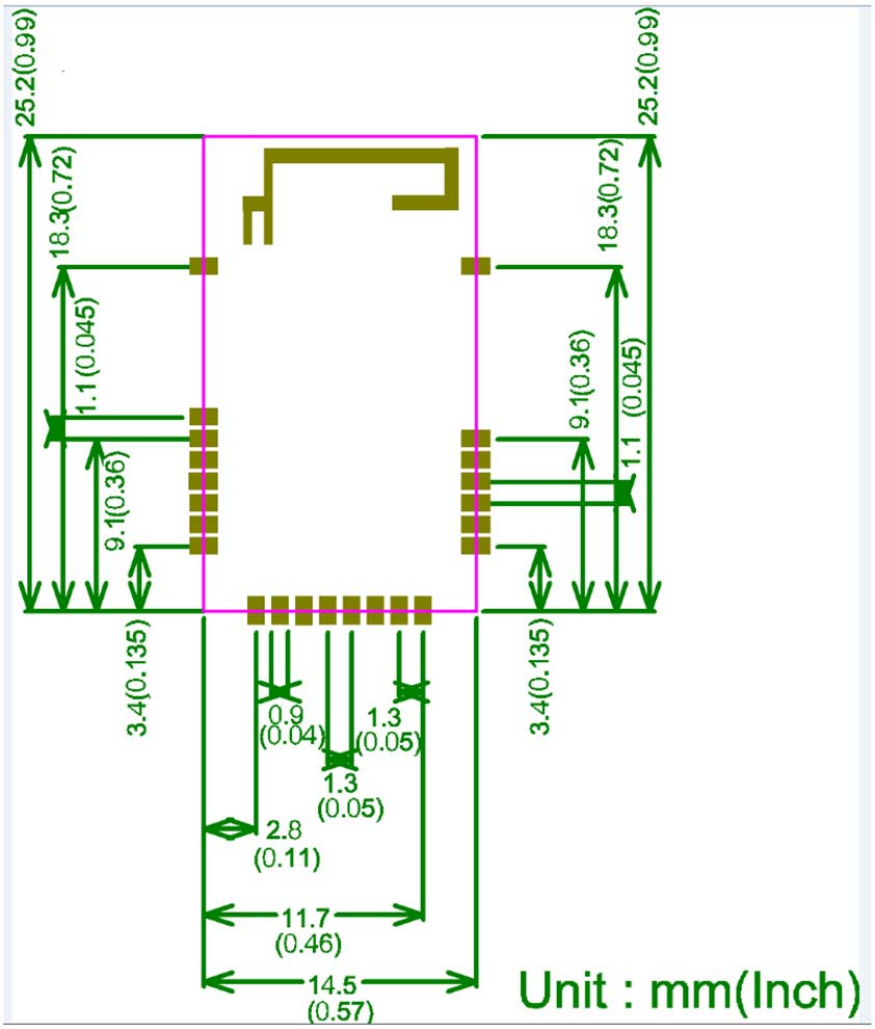
The list below reflects future application firmware that can be loaded into the RB1000 Family

Acronym	Description
• ANP	Alert Notification Profile
• ANS	Alert Notification Service
• BAS	Battery Service
• BLP	Blood Pressure Profile
• BLS	Blood Pressure Service
• CTS	Current Time Service
• DIS	Device Information Service
• FMP	Find Me Profile
• GLP	Glucose Profile
• GLS	Glucose Service
• HIDS	HID Service
• HOGP	HID over GATT Profile
• HTP	Health Thermometer Profile
• HTS	Health Thermometer Service
• HRP	Heart Rate Profile
• HRS	Heart Rate Service
• IAS	Immediate Alert Service
• LLS	Link Loss Service
• NDCS	Next DST Change Service
• PASP	Phone Alert Status Profile
• PASS	Phone Alert Status Service
• PXP	Proximity Profile
• RTUS	Reference Time Update Service
• ScPP	Scan Parameters Profile
• ScPS	Scan Parameters Service
• TIP	Time Profile
• TPS	Tx Power Service

Model and Ordering Information

Model Numbers	Description
RB1000/ BPM1000FCE 	0.57”x 0.99”x 0.12” surface mount, short range RB1000/BPM1000FCE Bluetooth module with on-board antenna
RB1000HM 	1.0” x 1.26” x 0.2” dual-in-line, through-hole Bluetooth module. RB1000 is mounted on Half Inch PCB for DIP (through-hole) interface to be RB1000HM.

RB1000/BPM1000FCE Mechanical Dimensions



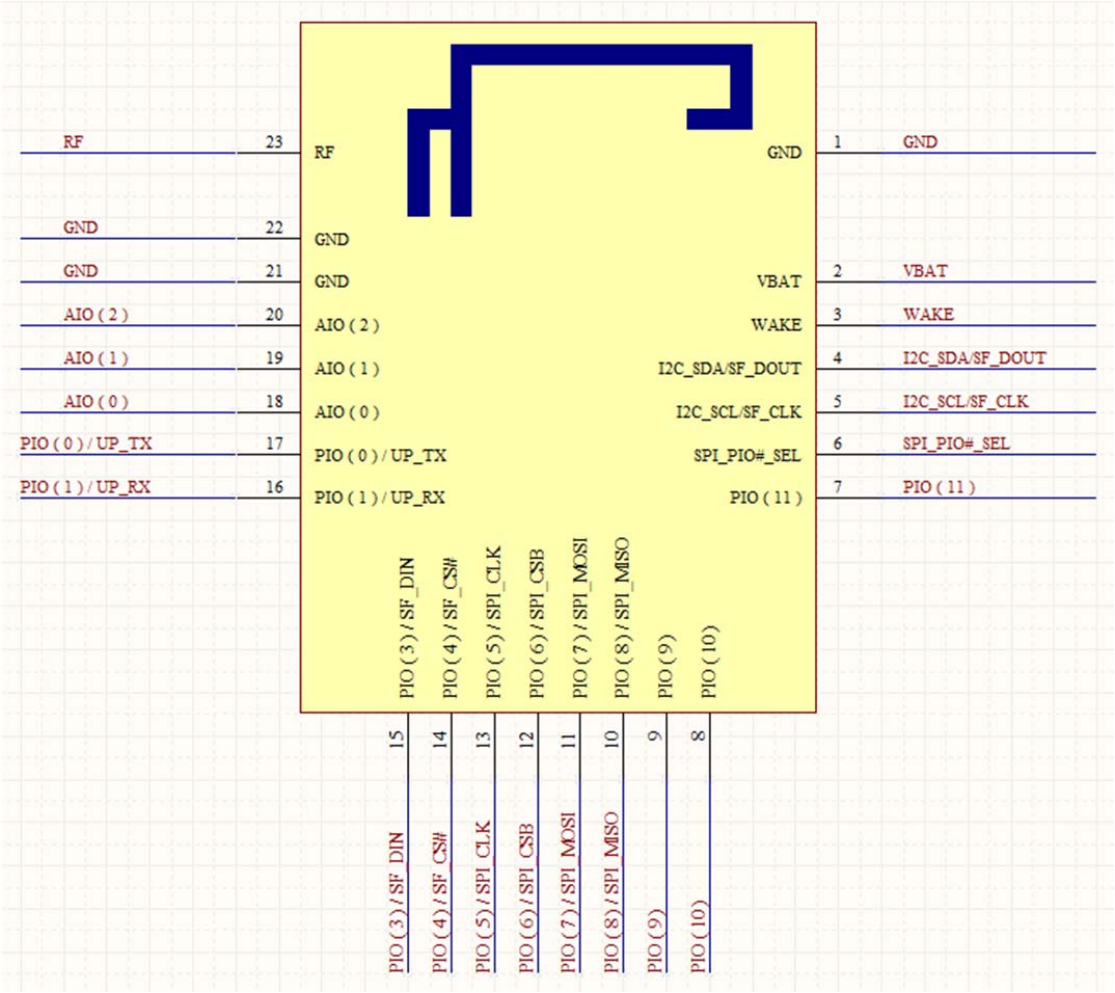
Module topside view:

Board size = 14.5 mm x 25.2 mm (0.57” x 0.99”)

Pitch = 1.14 mm (Left & Right side, 0.04”), 1.27mm (Down side, 0.05”)

Pad width = 0.91 mm (0.036”)

RB1000/BPM1000FCE Surface Mount Module Pin Definitions

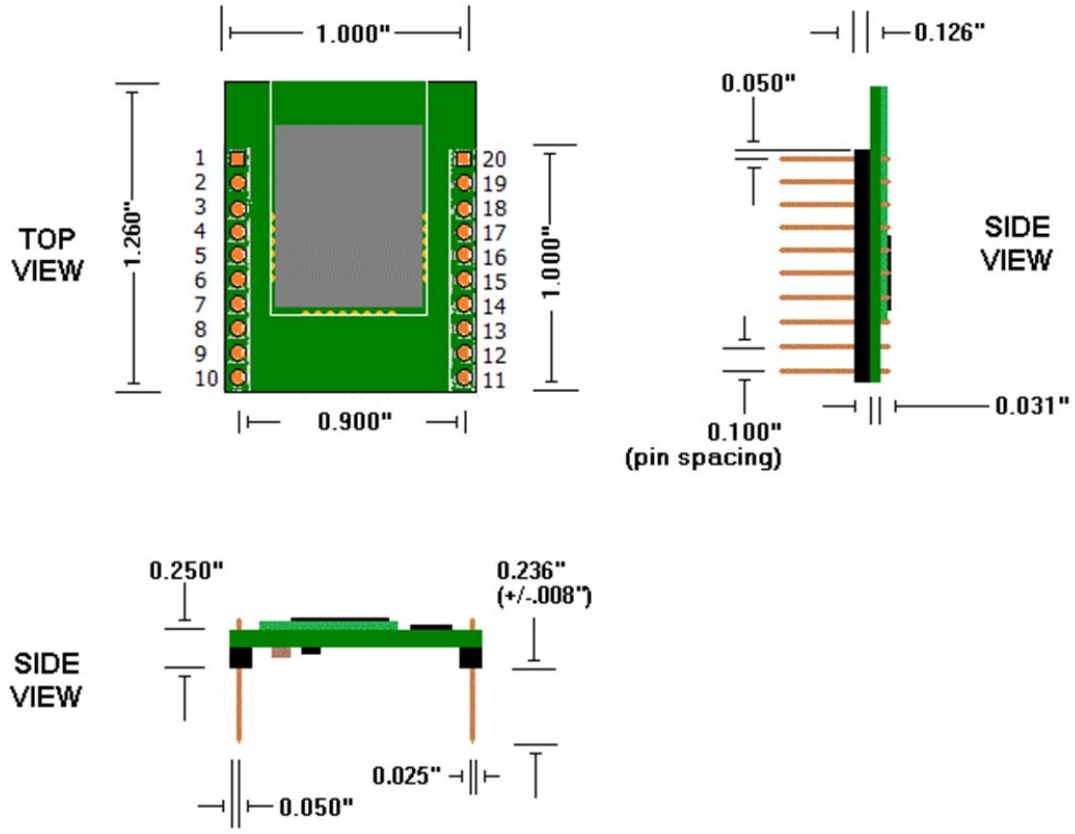


RB1000/BPM1000FCE Module Pin Descriptions

Pin #	Pin Name	Type	Description	I/O Voltage Range
1	GND	-	Ground	-
2	VBAT	PWR I	Battery input and regulator enable (active high).	2.35V ~ 3.6V
3	WAKE	PWR I	Input to wake CSR1000 QFN from hibernate or dormant.	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V
4	I²C_SDA /SF_DOUT	I/O or O	I²C data input / output or SPI serial Flash data output (SF_DOUT)	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh 0.75VDD Min
5	I²C_SCL / SF_CLK	O or O	I²C clock or SPI serial Flash clock output (SF_CLK)	Vol: 0.4V Max Voh 0.75VDD Min
6	SPI_PIO#_SEL	I	Selects SPI debug on PIO[8:5].	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V
7	PIO (11)	I/O	Programmable I/O line	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh 0.75VDD Min
8	PIO (10)	I/O	Programmable I/O line	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
9	PIO (9) CONNECTED	O	PIO (9) will go high when Bluetooth connection established.	Vol: 0.4V Max Voh: 0.75VDD Min
10	PIO (8) / SPI_MISO	I/O or I	Programmable I/O line or debug SPI MISO selected by SPI_PIO#	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
11	PIO (7) / SPI_MOSI	I/O or O	Programmable I/O line or debug SPI MOSI selected by SPI_PIO#	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh 0.75VDD Min
12	PIO (6) / SPI_CSB	I/O or I	Programmable I/O line or debug SPI chip select (CS#) selected by SPI_PIO#.	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
13	PIO (5) / SPI_CLK	I/O or O	Programmable I/O line or debug SPI CLK selected by SPI_PIO#.	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
14	PIO (4) / SF_CS#	I/O or I	Programmable I/O line or SPI serial flash chip select (SF_CS#)	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
15	PIO (3) / SF_DIN	I/O or I	Programmable I/O line or SPI serial flash data (SF_DIN) input	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
16	PIO (1) / UP_RX	I/O or I	Programmable I/O line or UART RX	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
17	PIO (0) / UP_ TX	I/O or O	Programmable I/O line or UART TX	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max

				Voh: 0.75VDD Min
18	AIO (0)	I/O	Analogue programmable I/O line	Input voltage: 0 – 1.3V
19	AIO (1)	I/O	Analogue programmable I/O line	Input voltage: 0 – 1.3V
20	AIO (2)	I/O	Analogue programmable I/O line	Input voltage: 0 – 1.3V
21	GND	-		-
22	GND	-		-
23	RF (Optional for External Antenna)	RF I/O	Bluetooth Transmitter / receiver	- No Connection

RB1000HM Mechanical Dimensions



Notes:

Pin spacing is 0.100 inch from center to center.

Square pins - 0.025" x 0.025"

Suggested mating female connector:

Samtec P/N. #SSW-110-21-G-S (RoHS Thru-Hole)

Samtec P/N. #SSW-110-22-G-S-VS (RoHS SMT)

RB1000HM Pin Descriptions

Pin #	Pin Name	Type	Description	I/O Voltage Range
1	GND	-		-
2	KEY	N/C	No Connections - No Pin – This Pin has been removed.	Add a key to the mating connector to prevent from being plugged in backwards.
3	AIO (1)	I/O	Analogue programmable I/O line	Input voltage: 0 – 1.3V
4	AIO (0)	I/O	Analogue programmable I/O line	Input voltage: 0 – 1.3V
5	UART_TX	I/O or O	UART TX	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
6	UART_RX	I/O or I	UART RX	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
7	PIO (3) / SF_DIN	I/O or I	Programmable I/O line or SPI serial flash data (SF_DIN) input	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
8	PIO (4) / SF_CS#	I/O or I	Programmable I/O line or SPI serial flash chip select (SF_CS#)	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
9	SPI_CLK	I/O or O	Programmable I/O line or debug SPI CLK selected by SPI_PIO#.	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
10	PIO (6) / SPI_CSB	I/O or I	Programmable I/O line or debug SPI chip select (CS#) selected by SPI_PIO#.	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh:0.75VDD Min
11	PIO (7) / SPI_MOSI	I/O or O	Programmable I/O line or debug SPI MOSI selected by SPI_PIO#	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
12	PIO (8) / SPI_MISO	I/O or I	Programmable I/O line or debug SPI MISO selected by SPI_PIO#	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
13	PIO (9) CONNECTED	O	PIO (9) will go high when Bluetooth connection established.	Vol: 0.4V Max Voh: 0.75VDD Min
14	PIO (10)	I/O	Programmable I/O line	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
15	PIO (11)	I/O	Programmable I/O line	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
16	SPI_PIO#_SEL	I	Selects SPI debug on PIO[8:5].	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V
17	I²C_SCL / SF_CLK	O or O	I²C clock or SPI serial Flash clock output (SF_CLK)	Vol: 0.4V Max Voh: 0.75VDD Min
18	I²C_SDA /SF_DOUT	I/O or O	I²C data input / output or SPI serial Flash data output (SF_DOUT)	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V Vol: 0.4V Max Voh: 0.75VDD Min
19	WAKE	PWR I	Input to wake CSR1000 QFN from hibernate or dormant.	Vil: -0.4V ~ 0.4V Vih: 0.7VDD ~VDD+0.4V
20	VBAT	PWR I	Battery input and regulator enable (active high).	2.35V-3.6V

The AT Commands

Using AT Commands for BLE Data Transfers - The RB1000 modules are defaulted to use the BLE Data Protocol and are controlled by Radicom's proprietary AT Command set. For BLE Data Protocol operation, you need one Radicom Master and one Radicom Slave module. The Slave Model RB1000-S advertises or broadcasts the Bluetooth signal. The Master Model RB1000-M will scan for Bluetooth signals and then request a Bluetooth connection. The RB1000-S Slave can then accept the connection for BLE Date transfers. The RB1000 Slave, can also operate with remote devices that also support the BLE Data Protocol.

The RB1000 modules use special AT Commands starting with the prefix "atbp-". The format of a basic "AT" command and result code is as follows:

atbp- <Command> <CR>
OK

atbp- = **AT**tention what follows is a command
<Command> = any valid command
<CR> = Carriage Return or Enter Key or Line Feed
OK = Result code meaning that the modem has accepted the command

Notes:

a) All AT commands must be sent in lower case. All command and result codes are echoed locally.

b) All AT commands are terminated with either a Carriage Return <CR> or Line Feed <LF> Character.

c) The RB1000s are always in the AT Command Mode, so it is recommended not to send Carriage Return <CR> or Line Feed <LF> Characters in the ASCII data stream. The receive data side will automatically append <CR> and <LF> characters after the received data to notify you that the data string is complete.

Establishing A Bluetooth Data Connection –

On the RB1000MB Slave side:

a) Issue "atbp-b" to stop advertising. The "Stop Adv." Result code will be displayed. b) Issue "atbp-a" to start advertising. The "Advertising" result code will be displayed.

On RB1000MB Master side:

a) Issue the "atbp-s" command to scan nearby device's Bluetooth address. The Master side RB1000 will display the "Scanning" result code followed by the Slave side Bluetooth Address. For example the Slave side Bluetooth address: 00025b001510 will appear as ADDR:0X00025b001510.

b) Issue the "atbp-c" command followed by the Bluetooth Address of the remote RB1000 "atbp-c00025b001510" to connect to Slave side. The Master side will display "Connecting 00025b001510" result code.

c) If the Bluetooth connection is established, the "CONNECT" result code will be displayed on both sides. The RB1000 can now start sending data to each other.

d) To send data from the Master issue "atbp-w12345" to send data "12345" (Up to 20 ASCII characters). The Master side will display the "Writing" result code followed by the "Success" result code. The Slave side will display the "Data" result code followed by the characters that were sent. If invalid data is sent from the Master side, the "Failed" result code will be sent.

e) To send data from the Slave side, issue "atbp-w12345" to send data "12345". The Slave side will simply display the "Sent" result code and the Master side will display "Data followed by the data that was sent.

f) To disconnect, issue "atbp-d" from the Master side. Both modules will display the "Disconnect" result code.

AT Command List

AT Command	Slave Side	Master Side	Description
atbp-a	√		Advertising On
atbp-b	√		Advertising Off
atbp-c		√	Connect to
atbp-d		√	Disconnect from
atbp-s		√	Scan nearby devices
atbp-v	√	√	Version
atbp-w	√	√	Write data to the other side

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.

FCC & IC Label and Model Identification

The RB1000 module family is FCC Part 15 and IC (Industry Canada) certified. The RB1000 is also CE marked. The modules are labeled with the RB1000 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 RB1000 Module.

Radicom Research Inc.

Model: RB1000

FCC ID: K7T-RB1000

IC: 2377A-RB1000

Radicom Research Inc.

Model: RB1000HM

FCC ID: K7T-RB1000

IC: 2377A-RB1000

Radicom Research Inc.

Model: BPM1000FCE

FCC ID: K7T-RB1000

IC: 2377A-RB1000

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

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:

Contains Transmitter

Module

Model: XXXXXXX FCC ID: K7T-RB1000

IC: 2377A-RB1000

CE

XXXXXXX is for the model of the module used in the end equipment. The XXXXXXX will be RB1000, RB1000HM, and BPM1000F. 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 present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de license. L'exploitation est autorisee aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit acceptor tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement.

The final end product must be labeled in a visible area with the following: "Contains FCC ID: K7T-RB1000, IC ID: 2377A-RB1000"

CE Declaration of Conformity

For the following equipment:

Radicom Research Inc. Bluetooth Module

Model(s): RB1000,RB1000HM, BPM1000F

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 61000-3-2:2006+A2:2009, EN 300 328 V1.7.1, EN 62311: 2008, EN 301 489-1 V1.9.2, V1.8.1, EN 61000-3-3:2008, EN 301 489-17 V2.1.1, EN 60950-1:2006+A11:2009+A1: 2010+A12:2011, EN300 328 V1.7.1, EN62311;2008

This equipment is marked with CE 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 DETECT.

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

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

2148 Bering Drive

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