

**Research In Motion Limited**

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RIM 902 OEM RADIO MODEM

Preliminary Design Summary

Introduction

The RIM 902 OEM radio modem is a small, low-cost device with the same capabilities as the current RIM 900 radio modem. It is a high-performance RF transceiver designed for system integration by original equipment manufacturers.

The RIM 902 operates in the 900 MHz frequency range, and is compatible with Mobitex wide-area wireless data communication networks such as BellSouth Wireless Data (formerly RAM Mobile Data) in the United States and Cantel AT&T in Canada.

Size and weight

The RIM 902 outer dimensions will be 42 x 67.5 x 8.4 mm. A mounting hole is located near each corner and may be used to bolt the radio into a device. The RIM 902 will weigh less than 36 grams.

RF properties

The RF properties of the RIM 902 including superior receiver sensitivity:

Property	Mobitex (RIM 902)
Transmit frequency	896 to 902 MHz
Transmit power*	0.062 to 2.0 watts (to antenna)
Receive frequency	935 to 941 MHz
Receive sensitivity	-118 dBm
Modulation	8000 bps 0.3 BT GMSK
Certification	FCC parts 15 and 90
(Required)	Industry Canada

*to conserve power, the RIM 902 will reduce transmit power when near a base station

Temperature sensor

An on-board temperature sensor provides thermal protection to the radio. If the transmitter is not used for some time, an application could use this facility to read the ambient temperature of the modem if required.



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Serial connector

The serial port will be a 22-pin ZIF FPC mounted along one end of the radio. A candidate for the interface connector is the AMP FPC (part# 2-487951-2). For ease of migration, the last 14 pins will correspond to the interface pin-out of the R801D and R900 radio modems. Serial port communication protocol will be compatible with the existing products. For power and added functionality, an additional eight (8) connectors are provided. All input and output lines are 3.0 volt logic; however, they will also be able to drive 3.3 volt systems. Further, all input lines to the serial port are 5.0 volt tolerant and outputs will be capable of driving 5.0 volt systems provided the V_{IH} of these pins is less than 2.5 volts. The general purpose I/O lines will be 3.0 volt interface only, therefore not 5.0 volt tolerant.

Pins	Description	
22 – Rx2	Rx from UART 0	This is a secondary 3-wire serial port available for use by a resident application. These lines may also be configured as an infrared transmit encoder and receive decoder, conforming to IrDA (Infrared Data Association) SIR (Serial Infrared) Physical Link Layer Specification.
13 – Tx2	Tx from UART 0	
21 – Rx1	Rx from UART 1	This is the primary communication port used by the modem. It is compatible with the National Semiconductor NS16550, with the necessary modem control signals. In some cases, the flow control lines may be used as additional general purpose I/O lines by a resident application
20 – Tx1	Tx from UART 1	
19 – DTR1	DTR from UART 1	
17 – DSR1	DSR from UART 1	
16 – RTS1	RTS from UART 1	
15 – CTS1	CTS from UART1	
14 – RI1	RI from UART 1	
18 – GND	Ground	These outputs can be connected to LED's or used as status lines to indicate when the radio is transmitting, turned on, in coverage, or with a message in the received buffer.
9 – GND	Ground	
12 – TRI	Transmit indicator	
11 – ONI	On indicator	
6 – COV	Coverage	This input should be set high in order to turn the radio on, or low to turn it off without disconnecting the power source.
5 – MSG	Message waiting	
10 – TURNON	Turn on input	Power input is 4.25 to 4.75 volts at 2.2 Amps max.
8 – VCCin	Power Supply Input	
7 – VCCin		These bi-directional general-purpose digital control lines are accessible by a resident application. They can be used for I ² C emulation, host power management, power fail detection, receive indicator, etc.
4 – IO1	Control line 1	
3 – IO2	Control line 2	
2 – IO3	Control line 3	
1 – IO4	Control line 4	



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Power requirements

The radio can be powered through pins 7 and 8 from a clean, stable 4.25 to 4.75 volt source that is capable of delivering a burst of up to 1.9 A when required by the transmitter. With an improperly matched antenna this burst could be as high as 2.2 A. The receiver current consumption is 66 mA and the standby current consumption is 0.07 to 0.2 mA. The maximum no-load voltage is 5.5 V, but must be below 4.75 V for transmit.

The radio closely synchronizes its receive windows with the base station, and will automatically enter low-power standby mode whenever possible. For example, after ten seconds of inactivity, the radio runs in standby mode for 97% of the time. After one minute of inactivity, standby is used 99.3% of the time. This is automatically handled by the radio firmware. The benefit is tremendously reduced power consumption.

Overall power consumption is highly application-dependent. For example, if the radio transmits large amounts of data, e.g. 22 full packets (512 bytes each) over a period of 90 seconds, once every 15 minutes, the average current consumption is approximately 45 mA at 4.5 V, or 202 mW. More typically, if the radio transmits a full packet once every ten minutes, and immediately receives a reply, and also receives an unsolicited packet every five minutes, the average current consumption is quite a bit lower (approximately 5.7 mA at 4.5 V, or 25 mW).

Specifications

Property	
Weight	less than 36 grams (1.26 oz)
Footprint	42 x 67.5 mm (1.65" x 2.65")
Thickness	8.4 mm (0.3")
Vibration	IEC 68-2-6 Part 2
Operating temperature	-30°C to +60°C (5 to 95% RH, non-condensing)
Storage temperature	-40°C to +85°C
Supply voltage range	4.25 to 4.75 volts (filtered and regulated)
Current requirements (at 4.5V)	standby: 0.07 to 0.2 mA receive: 66 mA transmit: 1900 mA nominal - max. 2200 mA burst
Current when turned off	under 0.02 mA

Engineering support

RIM has a team of experienced engineers dedicated to helping developers with RIM 902 integration projects. Engineering support, combined with the technical advantages of the RIM 902, ensures a high-performance wireless data solution.