RAK8211-NB Datasheet V1.0

Shenzhen Rakwireless Technology Co., Ltd.

www.rakwireless.com

info@rakwireless.com

Content

1. General Description

iTracker RAK8211-NB is versatile developer board aimed at aiding in quick prototypes using NB-IOT. The board includes a vast array of connectivity options (NB-IoT, BLE 5.0 and GPS) and sensors like an accelerometer, a light sensor and a barometric sensor. At the heart of the module is the venerable Nordic NRF52832 BLE processor. The NB-IoT connectivity is provided by the Quectel BC95 module. The RAK8211-NB module is Arduino friendly and can be programmed using the IDE. The board also provides SWD interface for programming the NRF52832 core. The combination of BLE and NB-IoT provides flexible low power consumption development along with myriad of application option ranging from telemetry to live tracking and environment sensing. With RAK8211 tracker board the sky is the limit for your ideas !!

2. Features & Applications

2.1 Features

- Arduino Compatible – Host controller NRF52832 has been widely used in Arduino environment
- Integrated Quectel BC95 NB-IoT wireless communication Module
- Integrated Quectel L70 GPS/GLONASS Module with Assisted-GPS
- Integrated LIS3DH ultra low-power, high performance 3-axes “nano” accelerometer
- Integrated LIS2MDL ultra-low-power, high-performance 3-axis digital magnetic sensor.
- Integrated BME280 ultra low-power, high linearity, high accuracy sensors for pressure, humidity and temperature
- Integrated OPT3001 that measures the intensity of visible light
- Size 43mm x 38mm x 18mm
- Operation temperature -40 ℃ to +85 ℃
- Power supply 3.3V to 5V (power at solar panel connector P2).

2.2 BLE Features

- Bluetooth 5.0
- Single chip, highly flexible, 2.4GHz multi-protocol
- 32-bit ARM Cortex-M4F Processor
- 512kB flash + 64kB RAM
- Supports concurrent Bluetooth low energy/ANT protocol operation
- Up to +4dBm output power
- -96dBm sensitivity, Bluetooth low energy
- 2 data rates (2Mbps/1Mbps)
- PPI-maximum flexibility for power-efficient applications and code simplification
- Automated power management system with automatic power management of each peripheral
- Configurable I/O mapping for analog and digital I/O
- 3 x Master/Slave SPI
- 2 x Two-wire interface (I²C)
- UART (RTS/CTS)
- 3 x PWM
- AES HW encryption
- 12-bit ADC
- Real Time Counter (RTC)
- Digital microphone interface (PDM)
- On-chip balun
- Over-the-Air(OTA) firmware update

2.3 Applications

- Vehicle location / fleet transportation management
- Safety monitoring of old / young children
- Animal protection and animal husbandry management
- Loss of assets / personnel positioning
- Other remote, battery powered applications

3. System Block Diagram

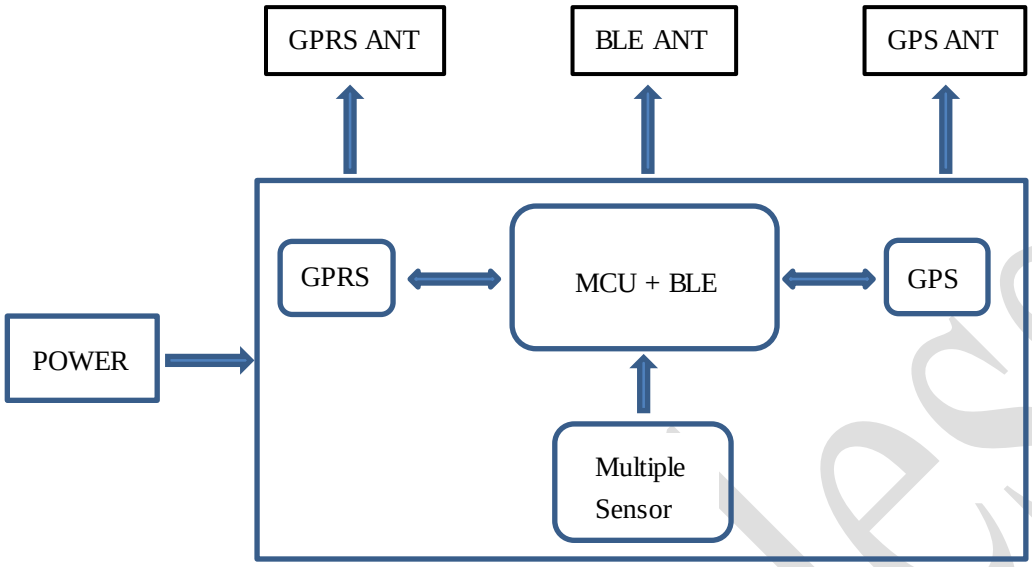
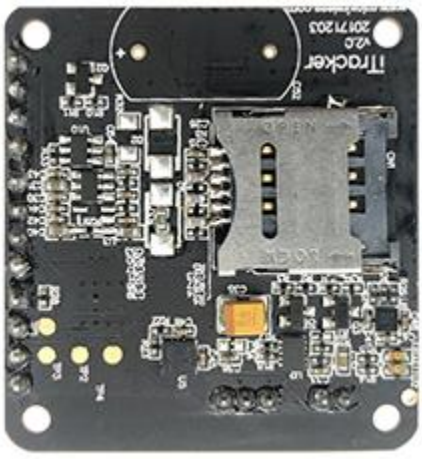


Figure 3-1 System Block Diagram

4. Product Details

4.1 Product Picture

Top View



Bottom View

Figure 4-1 Product Picture

4.2 Interface Definition

NO	Name	Type	Description
P1	VDD_nRF	P	VCC33
	SWDIO	DI/DO	Debug
	SWDCLK	DI	Debug
	GND	—	Ground
P2	VBUS	P	Charging interface/Connect to Solar panel
	GND	—	Ground
P3	BAT	P	Power Supply
	TEMP	O	Charge indicator
	GND	—	Ground
P4	RESET	Reset	Reset
	VCC33	P	VCC33
	GND	—	Ground
	TILT_DOUT	DI/DO,AI	Extended interface
P5	SENSOR_DOUT1	DI/DO,AI	Extended interface
	SENSOR_DOUT2	DI/DO,AI	Extended interface
	VCC33	P	VCC33
	GND	—	Ground

5. General Specification

5.1 Overall Specification

Model Name	RAK8211-NB
Dimension	L x W x H: 43 x 38 x 18 mm
Interface	Digital I/O, Analog input
Frequency Band	B1/B3/B8/B5/B20/B28*
Antenna Type	External antenna
Operating temperature	-40°C to +85°C
Storage temperature	-40°C to +85°C
Power Supply	3.5V~18V

5.2 GPS Specification

Feature	Description
L1 Band Receiver	Channel:22(Tracking) / 66(Acquisition)
	C/A Code
Horizontal Position Accuracy	Autonomous:<2.5m CEP
Velocity Accuracy	Without Aid:<0.1m/s
Acceleration Accuracy	Without Aid:<0.1m/s^2
Timing Accuracy	1PPS Out: 10ns
Reacquisition Time	<1s
TTFF@-130dBm with EASy™	Cold Start: <1s
	Warm Start: <5s
	Hot Start: <1s
Sensitivity	Acquisition: -148dBm
	Tracking: -165dBm
	Reacquisition: -160dBm
Dynamic Performance	Maximum Altitude: Max. 18000m
	Maximum Velocity: Max. 515m/s
	Maximum Acceleration: 4G
Protocols	NMEA 0183
	PMTK

5.3 GPRS Specification

Feature	Description
Frequency Band	BC95-B8 ： 900MHz BC95-B5 ： 850MHz BC95-B20 ： 800MHz BC95-B28 ： 700MHz
Rate : Single Tone	MAX Downstream 24kbps
	MAX Upstream 15.625kbps
Rate : Multi Tone	MAX Downstream 62.5kbps
	MAX Upstream 24kbps
Message	Send and receive point to point SMS
	Text and PDU mode
Output Power	23dBm±2dB
Sensitivity	-129dBm±1dB
Power	Save mode (PSM) : 3.6uA
	IDLE mode (Idle) : 2mA@DRX=1.28s
	LTE Cat NB1 net connecting status: 220mA@23dBm (Band 8/5/20) 250mA@23dBm (Band 28) 80mA@12dBm (Band 8/5/20/28) 65mA@0dBm (Band 8/5/20/28)
Protocol	IPv4/IPv6/UDP/CoAP/LwM2M/Non-IP/DTLS

6. Contact information

Shanghai

FAE mailbox:allan.jin@rakwireless.com

Tel : 185-1082-5762

Address: Room B205, Green light kechuang garden, 2588 Lane, Hongmei South road, Minhang District, Shanghai

Shenzhen

FAE mailbox: steven.tang@rakwireless.com

Tel : 0755-26506594

Fax: 0755-86152201

Address: Room 802, Yongfu building, No.1s06, Yongfu road, Baoan District , Shengzhen

7. Change Note

Version	Data	Change
V1.0	2018-3-13	Creator Document