



Overview

Rigado's BMD-200 is a powerful, highly flexible Bluetooth Smart module based on the nRF51822 SoC from Nordic Semiconductor. With an ARM® Cortex™ M0 CPU, embedded 2.4GHz transceiver, and on-module chip antenna, the BMD-200 provides a complete RF solution with no additional RF design, allowing faster time-to-market. The BMD-200 provides full use of the nRF51822's on-chip peripherals, allowing for a wide range of applications without the need for an external host microcontroller; simplifying designs and reducing BOM costs. With an internal DC-DC converter and a voltage supply range of 1.8V to 3.6V, the BMD-200 can be powered directly from a coin cell or two alkaline with ultra-low power consumption.



Key Features

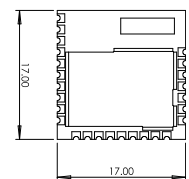
- Complete Bluetooth 4.1 Low Energy solution with integrated chip antenna
- Powerful & efficient 32-bit ARM® Cortex™ M0 CPU with 256kB flash & 32kB/16kB RAM
- Highly flexible GPIO & a rich digital and analog peripheral set that can interact without the CPU
- Pre-loaded BMDware provides iBeacon and UART bridge functions
- Encrypted Over-the-Air updates and Direct Test Mode enabled
- Bluetooth End Product qualified, FCC & IC certified, CE compliant

Quick Specifications

- Supply: 1.8V – 3.6V
- Tx Power: +4 dBm @ 16mA
- Rx Sensitivity: -93 dBm @ 13mA
- Pins: 15 GPIO (9 analog inputs)
- Interfaces: UART / I2C / SPI
- Memory: 256kB Flash / 32kB/16kB RAM
- Dimensions: 17 x 17 x 2.9mm
- Operating Temp: -25°C – 75°C

Applications

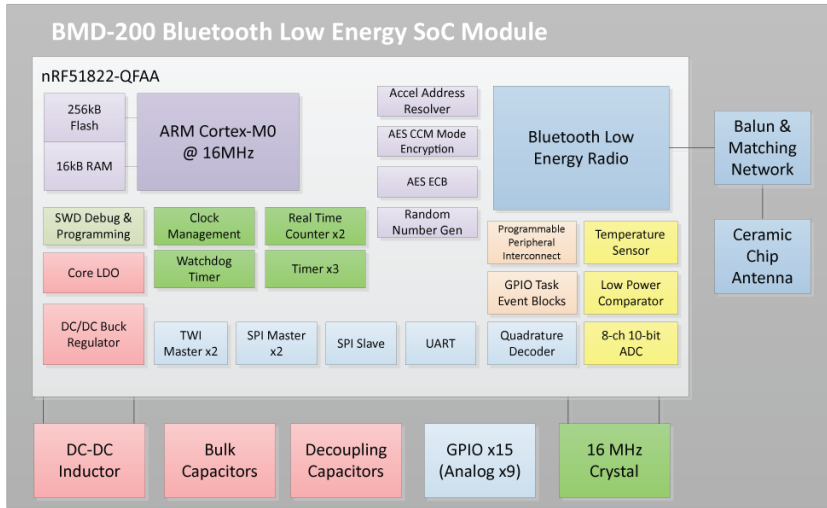
- App-cessories
- iBeacons™ / Proximity
- Low-Power Sensors
- Connected Appliances
- Lighting Products
- Fitness / Sports
- Wearables
- Home Automation



Actual Size



Block Diagram



SoftDevices

The BMD-200 fully supports Nordic Semiconductor RF protocol stacks known as SoftDevices. They integrate a Bluetooth low energy controller and host, and provide a full and flexible API for building Bluetooth low energy System on Chip (SoC) solutions.



Secure Bootloader

Encrypted Over-The-Air (OTA) and UART firmware updates add a layer of security to your application. The BMD-200 bootloader uses AES-128 encryption allowing for secure updates of your application firmware, bootloader, and SoftDevice.

BMDware

The BMD-200 comes standard with BMDware, providing iBeacon and UART Bridge functions without needing to program the module. Fully configurable over BLE and the UART for end-user or factory provisioning. Direct Test Mode (DTM) via UART is enabled to allow production Bluetooth RF testing with no configuration.

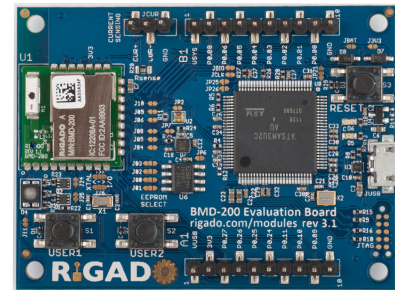
Specifications

General	
Operating Temperature	-25°C to 75°C
Storage Temperature	-40°C to 105°C
Physical Dimensions	17 x 17 x 2.9mm
Operating Supply	1.8V to 3.6V, 2.1V to 3.6V with DC/DC operating
Material	RoHS compliant
MAC Address	Unique MAC address provided (in flash & on label)
2.4 GHz Transceiver	
Bluetooth	BT 4.1 LE Peripheral (S110) BT 4.1 LE Central (S120) (up to 8 connections) BT 4.1 LE Concurrent Peripheral / Central (S130)
Frequency	2.402GHz to 2.480GHz
Modulations	GFSK at 250 kbps, 1 Mbps (BLE mode), 2 Mbps data rates
Transmit power	+4 dBm to -20 dBm (4 dB steps), -30 dBm whisper mode
Receiver sensitivity	-93 dBm (BLE mode)
RSSI	1 dB resolution
Antenna	Integrated ceramic chip
Approvals	
FCC	FCC part 15 modular qualification – FCC ID: 2AA9B03
IC	Industry Canada RSS-210 modular qualification – IC: 12208A-01
CE	EN 60950-1: 2011-01 3.1 (a) : Health and Safety of the User EN 301 489-17 V2.2.1 3.1 (b) : Electromagnetic Compatibility EN 300 328 V1.8.1 3.2 : Effective use of spectrum allocated
Bluetooth	RF-PHY Component (Tested) – DID: D024097 End Product with S110 7.0.0 – DID: D024117

Power Consumption	
Radio - Tx	16mA @ +4 dBm, 10.5mA @ 0dBm, 5.5mA @ -20 dBm, 7mA @ startup
Radio - Rx	13mA @ 1 Mbps (BLE mode), 8.7mA @ startup
CPU - running	275µA/MHz running from flash, 4.4mA @ 16MHz 150µA/MHz running from RAM, 2.4mA @ 16MHz
CPU - off/idle	2.6µA in ON mode, all blocks IDLE 1.8µA / 1.2µA / 0.6µA in OFF mode, 16kB / 8kB / No RAM retention
Peripherals	
UART	1 block. 1200 baud to 1M baud, parity, CTS & RTS support
SPI Master	2 blocks. 125kHz to 4MHz clock rates
SPI Slave	1 block. 125kHz to 2MHz clock rates
I2C Master	2 blocks. 100kHz to 400kHz clock rates
ADC	8-ch, 10-bit, 1/1, 1/2, & 1/3 input scaling 1.2V int ref, 2 ext ref inputs, VDD ref with 1/2 & 1/3 scaling
LP Comparator	8-ch, 2 ext ref inputs, VDD ref with 3-bit prescaler (x/8)
Temp. Sensor	Internal, -25°C to 75°C, +/- 4°C
GPIO	Input High: 0.7 x VDD, Input Low: 0.3 x VDD, 13kΩ pull-up/pull-down
Timers	One 32-bit & two 16-bit timers, one 24-bit RTC with 12-bit prescaler, watchdog

Evaluation Kit

The BMD-200 Evaluation Board is a versatile hardware platform that provides an easy jumping off point for any project.



- Full GPIO pin out
- I2C 3-axis accelerometer
- SPI EEPROM
- PWM controllable RGB LED
- 32.768 kHz Crystal
- Solder jumpers for full configurability
- Headers on 0.1" grid
- On-board programmer with COM port (JLink & mbed avail.)
- Analog ambient light sensor
- Two user buttons
- Current measuring header with sense resistor
- Power select for USB or coin cell battery

Ordering Information

Email modules@rigado.com for quotes and ordering or visit www.rigado.com/BMD-200

Part Number	Description
BMD-200-A	BMD-200 module, 16kB RAM
BMD-200-B	BMD-200 module, 32kB RAM
BMD-200-EVAL-M	BMD-200 Eval. Board with mbed programmer
BMD-200-EVAL-S	BMD-200 Eval. Board with Segger JLink-OB programmer

Design Services

Rigado has an experienced team of software, electrical, and mechanical engineers that provide solutions to today's technological challenges. Whether you need a polished prototype for your Kickstarter, a network of industrial sensors, or a complete product ready for mass production; Rigado can turn your ideas into reality.