



### Overview

Rigado's BMD-300 Series is a powerful, highly flexible, ultra-low power Bluetooth Smart module based on the nRF52832 SoC from Nordic Semiconductor. With an ARM® Cortex™ M4F CPU, embedded 2.4GHz multi-protocol transceiver, and an integrated antenna; the BMD-300 provides a complete RF solution allowing faster time-to-market with reduced development costs. The BMD-301 adds antenna flexibility with a U.FL connector. Providing full use of the nRF52832's capabilities and peripherals, the BMD-300 Series can power the most demanding applications, all while simplifying designs and reducing BOM costs. With an internal DC-DC converter and intelligent power control the BMD-300 Series provides class-leading power efficiency, enabling ultra-low power sensitive applications. Carrying FCC, IC and CE certifications and Bluetooth qualification, the BMD-300 Series is ready to implement right away.



### Key Features

- Complete Bluetooth 4.2 Low Energy and ANT solution for the most demanding applications
- Powerful & ultra-efficient 64MHz 32-bit ARM® Cortex™ M4F CPU with FPU and 512kB flash & 64kB 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

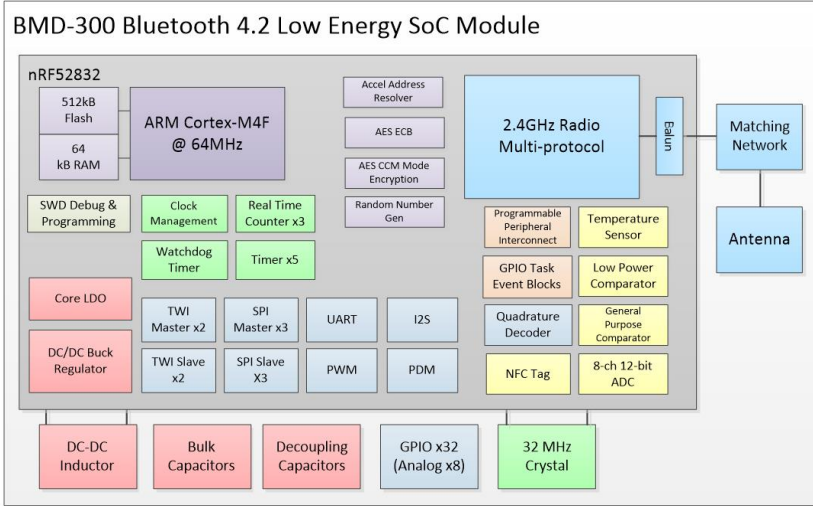
- Supply: 1.7V – 3.6V
- TX Power: 0 dBm @ 5.3mA
- Rx Sensitivity: -96 dBm @ 5.4mA
- Pins: 32 GPIO
- Interfaces: UART / I2C / SPI / PWM / I2S / PDM / NFC / ADC
- Memory: 512kB Flash / 64kB RAM
- Dimensions: 14.0 x 9.8 x 1.9mm
- Operating Temp: -40°C to +85°C

### Applications

- Internet of Things
- Wearables
- App-cessories
- iBeacons™ / Proximity
- Fitness / Sports
- Smart Toys
- Connected Appliances
- Lighting Products
- Voice Command
- Low-Power Sensor Networks
- Home & Building Automation
- Key Fobs/Wrist Watches
- Interactive Entertainment Devices
- Remote / Gaming Controls
- A4WP Wireless Chargers
- Multi-touch Trackpads



## Block Diagram



## SoftDevices

The BMD-300 Series 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-300 Series bootloader uses AES-128 encryption allowing for secure updates of your application firmware, bootloader, and SoftDevice.

## BMDware

The BMD-300 Series 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	-40°C to +85°C
Storage Temperature	-40°C to +125°C
Physical Dimensions	14.0 x 9.8 x 1.9mm (preliminary)
Operating Supply	1.7V to 3.6V
Material	RoHS compliant
MAC Address	Unique MAC address provided (in flash & on label)
2.4 GHz Transceiver	
SoftDevices	BT 4.2 LE Concurrent Peripheral / Central (S132) ANT (S212), Combined BLE/ANT (S332)
Frequency	2.360GHz to 2.500GHz
Modulations	GFSK at 1 Mbps (BLE mode), 2 Mbps data rates
Transmit power	+4 dBm to -20 dBm (4 dB steps), -40 dBm whisper mode
Receiver sensitivity	-96 dBm (BLE mode)
RSSI	1 dB resolution
Antenna	Integrated antenna
Approvals (Scheduled Q4 2015)	
FCC	FCC part 15 modular qualification – FCC ID: 2AA9B04
IC	Industry Canada RSS-210 modular qualification – IC: 12208A-04
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
Japan (TELEC)	MIC of Japan – Type Certificate Number: 210-106799
Australia, New Zealand	AS/NZS 4268 :2012+AMDT 1:2013, Short range devices
Bluetooth	RF-PHY Component (Tested) – DID: TBD End Product with S132 – DID: TBD

Power Consumption	
Radio - Tx	7.5mA @ +4dBm, 5.3mA @ 0dBm
Radio - Rx	5.4mA @ 1Mbps (BLE mode)
CPU - running	58µA/MHz running from flash, 3.7mA @ 64MHz 52µA/MHz running from RAM, 3.3mA @ 64MHz
CPU - off/idle	1.3µA in ON mode, with RTC 1.2µA in ON mode, all blocks IDLE 0.7µA in OFF mode, +20nA per 4kB RAM retention

Peripherals	
UART	1 block. 1200 baud to 1M baud, parity, CTS & RTS support
SPI Master	3 blocks. 125kHz to 8MHz clock rates
SPI Slave	3 blocks. 125kHz to 8MHz clock rates
TWI (I2C) Master	2 blocks. 100kHz to 400kHz clock rates
TWI (I2C) Slave	2 blocks. 100kHz to 400kHz clock rates
NFC	NFC-A, 13.56MHz, 106kbps, wake-on-field
PDM	1 block. 2 microphones (left/right) 16kHz sample rate, 16-bit
I2S	1 block. Master and Slave, bidirectional.
ADC	8-ch, 12-bit @ 200ksps
PWM	3 blocks, 4 channels each.
LP Comparator	8-ch, VDD, int & ext ref, 15 levels
GP Comparator	8-ch, VDD & internal ref, 64 levels
Temp. Sensor	Internal, -40°C to 85°C, +/- 4°C, 0.25°C resolution
GPIO	Input High: 0.7 x VDD, Input Low: 0.3 x VDD, 13kQ pull-up/pull-down
Timers	5 x 32-bit & three 24-bit RTC with 12-bit prescaler, watchdog

## Ordering Information

Email [modules@rigado.com](mailto:modules@rigado.com) for quotes and ordering or visit <http://www.rigado.com/BMD-300>

Part Number	Description
BMD-300-A	BMD-300 module, nRF52832, integrated antenna
BMD-301-A	BMD-301 module, nRF52832, U.FL connector for external antenna
BMD-300-EVAL-S	BMD-300 Eval. Board with Segger J-Link-OB programmer
BMD-301-EVAL-S	BMD-301 Eval. Board with Segger J-Link-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.

## Availability Information

Email [modules@rigado.com](mailto:modules@rigado.com) for the latest on availability and to reserve samples.

🔧 Mass Production: Q1 2016

## Our expertise

- 🔧 Electrical, software, mechanical and industrial design
- 🔧 Bluetooth Low Energy and Low-Power Wireless
- 🔧 FPGA and CPLD Design
- 🔧 Proof of Concept, Prototyping, and Turnkey products
- 🔧 Product Management