Product summary
BMD-34 series

Stand-alone Bluetooth 5 low energy modules

Full Bluetooth 5, Thread, and Zigbee (IEEE 802.15.4) solution

- Powerful, ultra-efficient 64 MHz 32-bit Arm® Cortex®-M4 with FPU, 1 MB Flash, and 256 kB RAM
- Bluetooth 5 long range support (Coded PHY)
- USB 2.0 and Built-in DC-DC converter for direct USB / Li-Ion power
- Hardware cryptographic unit for secure boot and over-the-air updates
- Optional PA/LNA for extreme range

10.2 × 15.0 × 1.9 mm   BMD-340   BMD-341

10.2 × 15.0 × 2.0 mm   BMD-345

Product description

The BMD-34 series are advanced, highly flexible, ultra-low-power multiprotocol modules that enable concurrent Bluetooth 5, Thread and Zigbee (IEEE 802.15.4) connectivity for portable, extremely low power embedded systems, offering the greatest radio range and coverage. With an Arm® Cortex®-M4 with FPU, integrated 2.4 GHz transceiver, an extended range of interfaces and embedded hardware cryptographic engine, the BMD-34 modules provide a complete RF solution allowing faster time to market with reduced development costs and advanced security capabilities. Providing full use of the Nordic nRF52840's capabilities and peripherals, the BMD-34 can power the most demanding applications, all while simplifying designs and reducing BOM costs.

The BMD-34 is an ideal solution for designs that require Bluetooth 5 features or 802.15.4 based networking for Thread and Zigbee. The Bluetooth 5 long range feature provides extended range, and the optional PA/LNA boost the link budget even further, bringing range and coverage to the maximum. Built in USB and 5.5 V compatible DC-DC supply reduces design complexity and BOM cost, while expanding possible applications. The modules are certified for Europe, US, Canada, and Australia/New Zealand, including antenna alternatives for either internal PCB antenna, or a U.FL antenna connector for external antenna. BMD-34 designs are footprint compatible with a range of other BMD-modules, thus providing flexibility for tiered product lineups.

	BMD-340	BMD-341	BMD-345
Grade			
Automotive			
Professional			
Standard	•	•	•
Radio			
Chip inside		nRF52840	
Bluetooth qualification	v5.0	v5.0	v5.0
Bluetooth low energy	•	•	•
Thread / Zigbee	•	•	•
Bluetooth output power EIRP [dBm]	7	11	18
Max range [meters]	500	750	1700
NFC	•	•	•
Antenna type (see footnotes)	pcb	U.FL	U.FL
Application software			
Open CPU for embedded applications	•	•	•
Interfaces			
UART	♦	♦	♦
SPI	♦	♦	♦
I2C	♦	♦	♦
I2S	♦	♦	♦
USB	♦	♦	♦
PDM and PWM	♦	♦	♦
GPIO pins	48	48	44
AD converters [number of bits]	12	12	12
Features			
MCU (see footnotes)	M4F	M4F	M4F
RAM [kB]	256	256	256
Flash [kB]	1024	1024	1024
Simultaneous GATT server and client	♦	♦	♦
Throughput [Mbit/s]	1.4	1.4	1.4
Maximum Bluetooth connections	20	20	20
Secure boot	♦	♦	♦
Bluetooth mesh	♦	♦	♦
FOTA	♦	♦	♦

pcb = Internal PCB antenna
U.FL = U.FL antenna connector
M4F = 64 MHz Arm® Cortex®-M4 with FPU

♦ = Feature enabled by HW. The actual support depends on the open CPU application SW.

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BMD-34 series

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Features

Bluetooth	v5.0 (Bluetooth low energy)
NFC	NFC-A tag support
Range	BMD-340: 500 m BMD-341: 750 m BMD-345: 1700 m
Max. radiated output power (EIRP)	BMD-340: 7 dBm BMD-341: 11 dBm BMD-345: 18 dBm
Conducted sensitivity (Bluetooth mode)	BMD-340, -341: –96 dBm (1 Mbit/s) –103 dBm (125 Kbit/s) BMD-345: –102 dBm (1 Mbit/s) –107 dBm (125 kbit/s)
Bluetooth address	Unique public Bluetooth address provided (in flash, on label)
Bluetooth operating modes	Simultaneous central and peripheral roles LE 2M PHY (2 Mbps) LE 1M PHY (1 Mbps) Coded PHY 500 kbps (long range) Coded PHY 125 kbps (long range) Advertising Extensions LE Data Length Extension Channel Selection Algorithm #2
Antenna	BMD-340: Integrated PCB antenna BMD-341, -345: U.FL antenna connector
Development environment	Nordic SDK (including Bluetooth Mesh HomeKit™, AirFuel™e, IoT) Customers develop and embed their own application on top of the Bluetooth stack in the BMD-34 modules (open CPU concept)
Security	Arm® TrustZone® CryptoCell™ cryptographic unit Secure boot Secure Simple Pairing 128-bit AES encryption Bluetooth low energy secure connections

Interfaces and peripherals*

UART	2 blocks. 1200 baud to 1 M baud, parity, CTS and RTS support
SPI Master	4 blocks. 125 kHz to 8 Mhz clock rates
SPI Slave	3 blocks. 125 kHz to 8 Mhz clock rates
QSPI Master	1 block. Max 32 MHz. XIP support
TWI (I2C) Master	2 blocks. 100 kHz to 400 kHz clock rates
TWI (I2C) Slave	2 blocks. 100 kHz to 400 kHz clock rates
NFC	NFC-A, 13.56 MHz, 106 kbps, wake-on-field
PDM	1 block. 2 microphones (left/right) 16 kHz sample rate, 16-bit
I2S	1 block. Master and slave, bidirectional
ADC	8-ch, 12-bit @ 200 ksps
PWM	4 blocks, 4 channels each
LP Comparator	8-ch, VCC, int and ext ref, 15 levels
GP Comparator	8-ch, VCC and internal ref, 64 levels
Temp. Sensor	Internal, -40 °C to 85 °C, +/- 4 °C, 0.25 °C resolution
GPIO	BMD-340, -341: 48; BMD-345: 44 Input High: 0.7 x VCC; Input Low: 0.3 x VCC; 13 kΩ pull-up/pull-down
Timers	5 x 32-bit and 3 x 24-bit RTC with 12-bit prescaler, watchdog
USB peripheral	1 block. USB 2.0 full speed, 12 Mbps. 2 control, 14 bulk/interrupt endpoints

* Not all simultaneously

Further information

For contact information, see www.u-blox.com/contact-us.

For more product details and ordering information, see the product data sheet.

UBX-19033359 - R06

Package

Dimensions	BMD-340, -341: 10.2 × 15.0 × 1.9 mm BMD-345: 10.2 × 15.0 × 2.0 mm
Weight	< 1.0 g
Mounting	Machine mountable Solder pins

Environmental data, quality & reliability

Operating temperature	–40 °C to +85 °C
Storage temperature	–40 °C to +125 °C
Humidity	RH 5 – 90% non-condensing
RoHS	RoHS 3 compliant

Electrical data

Power supply	BMD-340, -341: 1.7 VDC to 5.5 VDC BMD-345: 2.0 VDC to 3.6 VDC
Power consumption in Bluetooth low energy mode for BMD-340, BMD-341	TX only @ max TX power: 14.8 mA @ 3 V TX only @ 0 dBm: 4.8 mA @ 3 V Off, no RAM retention: 0.4 µA at 3 V On, no RAM retention: 0.97 µA at 3 V
Power consumption in Bluetooth low energy mode for BMD-345	TX only @ max TX power: 51 mA @ 3 V Off, no RAM retention: 0.7 µA @ 3 V On, no RAM retention: 1.3 µA @ 3 V

Certifications and approvals

Type approvals	Europe (ETSI RED); US (FCC/CFR 47 part 15 unlicensed modular transmitter approval); Canada (ISED RSS); Australia and New Zealand (RCM); Japan (MIC) - only for BMD-340
Health and safety	EN 62479, EN 62368-1
Bluetooth qualification	v5.0 (Bluetooth low energy), Bluetooth RF PHY

Support products

BMD-340-Eval	Evaluation kit for BMD-340 with open CPU and internal PCB antenna
BMD-341-Eval	Evaluation kit for BMD-341 with open CPU and U.FL antenna connector
BMD-345-Eval	Evaluation kit for BMD-345 with open CPU, PA/LNA, and U.FL antenna connector

Product variants

BMD-340	With internal PCB antenna, open CPU
BMD-341	With U.FL antenna connector, open CPU
BMD-345	With U.FL antenna connector, PA/LNA, open CPU

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