Product summary

BMD-380 module

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Stand-alone Bluetooth 5.1 low energy modules

Standard

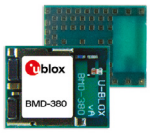
Professional

Automotive

Ultra-compact Bluetooth 5.1, 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
- Miniature footprint of 7.5 x 9.5 mm to fit the most compact designs
- 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
- Integrated chip antenna

7.5 × 9.5 × 1.5 mm



Product description

The BMD-380 module is an ultra-compact, advanced, highly flexible, low power multiprotocol module that enables concurrent Bluetooth 5.1, Thread and Zigbee (IEEE 802.15.4) connectivity for compact, portable, extremely low power embedded systems. The module fully integrates the highly capable Nordic Semiconductor nRF52840 chip with an optimized and complete radio design including a ceramic chip antenna and radio type approvals. With the Arm® Cortex®-M4 with FPU, integrated 2.4 GHz transceiver, an extended range of interfaces and embedded hardware cryptographic engine, the BMD-380 module provides 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-380 can power the most demanding applications, all while simplifying designs with its very compact size and integrated antenna.

The BMD-380 is an ideal solution for size-constrained 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 coverage. The built-in USB and 5.5 V compatible DC-DC supply reduce design complexity and BOM cost, while expanding possible applications. The modules are fully certified for Europe, US, Canada, Japan, and Australia/New Zealand.

	BMD-380
Grade	
Automotive	
Professional	
Standard	•
Radio	
Chip inside	nRF52840
Bluetooth qualification	v5.1
Bluetooth low energy	•
Thread / Zigbee	•
Bluetooth output power EIRP [dBm]	7
Max range [meters]	500
NFC	•
Antenna type (see footnotes)	chip
Application software	
Open CPU for embedded applications	•
Interfaces	
UART	♦
SPI	♦
I2C	♦
I2S	♦
USB	♦
PDM and PWM	♦
GPIO pins	44
AD converters [number of bits]	12
Features	
MCU (see footnotes)	M4F
RAM [kB]	256
Flash [kB]	1024
Simultaneous GATT server and client	♦
Throughput [Mbit/s]	1.4
Maximum Bluetooth connections	20
Secure boot	♦
Bluetooth mesh	♦
FOTA	♦

chip = Internal chip 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.

BMD-380 module

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Features

Bluetooth	v5.1 (Bluetooth low energy)
NFC	NFC-A tag support
Range	500 m
Max. radiated output power (EIRP)	7 dBm
Conducted sensitivity (Bluetooth mode)	–95 dBm (1 Mbit/s) –103 dBm (125 Kbit/s)
Bluetooth address	Unique public Bluetooth address provided (in flash)
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	Ceramic chip antenna
Development environment	Nordic SDK (including Bluetooth Mesh HomeKit, AirFuel, IoT) Customers develop and embed their own application on top of the Bluetooth stack in the BMD-380 module (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	44 GPIOs 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

Package

Dimensions	7.5 x 9.5 × 1.5 mm
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	1.7 VDC to 5.5 VDC
Power consumption in Bluetooth low energy mode	TX only @ +8 dBm 14.8 mA @ 3V TX only @ 0 dBm: 4.8mA @ 3V No RAM retention: 0.4 µA at 3 V No RAM retention, wake on RTC: 1.5 µA at 3 V

Certifications and approvals

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

Support products

BMD-380-Eval	Evaluation kit for BMD-380 with open CPU and internal chip antenna

Product variants

BMD-380	With internal chip antenna, open CPU

Further information

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

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