

Nordic modules are powerful, highly flexible, ultra low power Bluetooth Low Energy (BLE) modules using Nordic nRF52 or nRF53 SoCs. With an ARM Cortex™ M4F or dual Cortex M33 MCU, up to 128 MHz clock, up to 1MB flash, 512KB RAM, embedded 2.4GHz multi-protocol transceiver, integrated antenna or u.FL connector, it allows faster time to market with reduced development cost.

BM, Low Cost, Mini Module, from \$3 at 1K pcs

Reduce cost without reducing features or quality. All GPIOs of nRF52832/810/811/833 are accessible. PCB trace antenna and DCDC converter inductors are integrated.



BC, Compact Module

At 7.8x8.8x1.3mm, BC832 is the smallest BLE module with castellated pins. BC840/M/E are compact nRF52840 module, size from 7.1x9.2mm. Range to 3400 meters at 125 Kbps..

BC805M, the \$1.75 BLE 5.2 module, castellated pins.

BT, Feature Upgradeable, BLE Range to 4500meters+
BT Series, 18 modules with compatible footprints, support BLE 5/5.1, Thread, and Zigbee radio protocols. Max. TX power is + 21 dBm. Bluetooth range between 2 modules is >4500 meters at 125 kbps.

A host board design can accommodate all BT or BM Series modules, allowing easy range and feature upgrade.

LTE, BLE, LoRa Modules for M.2 Connector

LTE-M/NB-IoT, LTE-BLE combo, BLE, BLE 5.1-LoRa combo modules are available for M.2 connector, B key.

32MHz & 32.768kHz Crystals, -40°C to 105°C

BT40, BT40F, BT40E, BT40X, BC833M, BC833E have both crystals, +/- 20PPM on board.

IEEE802.15.4 Thread, Zigbee

Many modules support IEEE 802.15.4 Thread, Zigbee, and proprietary radio protocols.

Connecting to Android OS

Android apps and source codes are available for connecting to Android OS devices.

AT Commands

All nRF52 modules are preloaded with AT command codes.

Connecting to Cloud

Open source BLE 5/5.1 to WiFi, Ethernet, and LTE gateways provide application examples for connecting to Fanstel development server or **Google IoT Core** Cloud Platform.

USB Dongles

OpenSource USB dongles are pre-certified with market ready enclosure.

Toshiba BLE 5 and Dual Mode Module

Price of HCI interface module is from \$3.00 at 1 pcs.

Operating temperature is up to 125°C. Dual mode module is available.

Semtech LoRa Module

SX1262 module, LR62E is paired with BM833 in reference design.

ESP32 WiFi Modules (ESP32-WROOM-32D Clones)

Better quality components to improve RF circuit performance and to increase operating temperature to -40°C/105°C.

Nordic Bluetooth 5.2 Modules

module	BM833A/AF	BM833/E	BM833F	BT40/E	BT40F	BT40X	BC833M/E	BC805M
Size, mm	10.2x15/15x20.	10.2x15x1.9	15x20.6x1.9	14x16x1.9	15x20.8x1.9	15x28x1.9	10x14.3x1.9	10x14.3x1.9
SoC	nRF52811	nRF52833	nRF52833	nRF5340	nRF5340	nRF5340+21540	nRF52833	nRF52805
MCU/Flash/RAM	Cortex M4/192/24KB	M4F/512/256KB	M4F/512/256KB	M33/256/64KB	M33/256/64KB	M33/256/64KB	M4F/512/128KB	M4/192/24KB
MCU 2/Flash/RAM				M33/1024/512KB	M33/1024/512KB	M33/1024/512KB		
NFC	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Directional Finding	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
IEEE 802.15.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
USB		Yes	Yes	Yes	Yes	Yes	Yes	No
CryptoCell-3				Yes	Yes	Yes	No	No
GPIO pins	32, LGA	42, LGA	42, LGA	48, LGA/CAS	48, LGA/CAS	48, LGA/CAS	18, LGA	10, CAS
Antenna	PCB trace	PCB trace/u.FL	PCB Trace	PCB Trace/u.FL	High Perf. Trace	PA+PCB+u.FL	PCB/u.FL	PCB
range, 125Kbps, est.	680/1400	1400/3400	2300 meters				1400/3400	200 meters
Operating temp.	-40°C to +85°C	-40°C to +105°C	-40°C to +105°C	-40°C to +105°C	-40°C to +105°C	-40°C to +105°C	-40°C to +105°C	-40°C to +85°C
peak current RX	4.6 mA	4.6 mA	4.6 mA	2.6 mA	2.6 mA		4.7 mA	4.6 mA
peak current TX	4.6mA, 0dBm	4.8mA, 0dBm	4.8mA, 0dBm	3.2 mA, 0dBm	3.2 mA, 0 dBm		4.9 mA	4.6 mA, 0 dBm
DCDC inductors	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated
32.768kHz crystal	Ext.	Ext.	Ext.	Integrated	Integrated	Integrated	Integrated	Ext.
Certifications	FCC, IC, CE, JPAU, QDID	FCC, IC, CE, JPAU, QDID	FCC, IC, CE, JPAU, QDID					
Eval board	EV-BM833A/AF	EV-BM833/E	EV-BM833F	EV-BT40/E	EV-BT40F	EV-BT40X	EV-BC833M/E	EV-BC805M
1K price, ea.	\$3.32/\$3.67	\$4.66/\$5.73	\$5.77	\$7.21/\$7.75	\$8.06		\$3.92/\$4.28	\$1.75
Availability	production	production	production	4Q20	4Q20	1H21	4Q20	4Q20

	WiFi Modules		LoRa Module	Toshiba BLE 5 & Dual Mode Modules		
Modules	ESP32M4	ESP32M16/E16	LR62E	BT680F/E	BT680T/TA	BH661C-503
Sizes, mm	18x25.5	18x25.5	10.2x15x1.9	15x20.8x1.9	15x20.8x1.9	11x16.7x1.9
SoC	ESP32-D0WD	ESP32-D0WD	SX1262	TC35680	TC35681	TC35661-503
Flash/RAM/ROM	4MB/520/448KB	16MB/520/448KB		128/144/240KB	0/144/240KB	
Note				HCI	HCI	Dual mode
Antenna	PCB Trace	PCB Trace/u.FL	u.FL	PCB trace/u.FL	PCB trace	Chip
Certifications	FCC, IC, CE	FCC, IC, CE		FCC, IC	FCC, IC	FCC, IC
Operating temp.	-40°C to +105°C	-40°C to +105°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85/125°C	-40°C to +85°C
Eval board			EV-LR62E	EV-BT680F/E	EV-BT680T/TA	EV-BH661C-503
1K price, ea.	\$3.11	\$3.99/\$4.18	\$7.32	\$3.86/\$4.25	\$3.00/\$5.83	\$4.71
Availability	Production	Production	4Q20	Production	Production	Production

Nordic BT Series, upgradeable features and range						
BLE 5 modules	BT832/BT832A	BT832F/BT832AF	BT832X	BT840F	BT840	BT840X
with u.FL			BT832XE		BT840E	BT840XE
Sizes, mm	14x16x1.9	15x20.8x1.9	15x28x1.9	15x20.8x1.9	14x16x1.9	15x28x1.9
SoC	nRF52832/810	nRF52832/810	nRF52832	nRF52840	nRF52840	nRF52840
Flash	512KB/192KB	512KB/192KB	512KB	1MB	1MB	1MB
RAM	64KB/24KB	64KB/24KB	64KB	256KB	256KB	256KB
CryptoCell 310				Yes	Yes	Yes
IEEE 802.15.4				Yes	Yes	Yes
NFC	Yes/No	Yes/No	Yes	Yes	Yes	Yes
USB controller				Yes	Yes	Yes
GPIO pins	32	32	29	48	48	45
Pins	40, CAS/LGA	40, CAS/LGA	40, CAS/LGA	61, CAS/LGA	61, CAS/LGA	61, CAS/LGA
Antenna	PCB trace	PCB trace	PA + PCB trace	PCB trace	PCB trace	PA + PCB Trace
Range, 1 Mbps	100 meters	760 meters	1140 meters	1000 meters	150 meters	1170 meters
Ant. at, 1.52m		390 meters	1120 meters	390 meters	120 meters	900 meters
Range, 125Kbps				2300 meters	320 meters	>4500 M
Ant at 1.52m				640 meters	210 meters	1240 meters
peak current RX	5.4 mA	5.4 mA		6.4 mA	6.4 mA	
peak current TX	7.5mA, +4dBm	7.5mA, +4dBm	95mA, +20dBm	13.6mA +8dBm	13.6mA +8dBm	
DCDC inductors	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated
32.768kHz crystal	Ext.	Ext.	Integrated	Ext.	Ext.	Integrated
Certifications	FCC, IC, CE, JPAU, QDID	FCC, IC, CE, JPAU, QDID	FCC, IC, QDID	FCC, IC, CE, QDID	FCC, IC, CE, QDID	FCC, IC, CE, AU, QDID
Eval board	EV-BT832/A	EV-BT832F/AF	EV-BT832X/XE	EV-BT840F	EV-BT840/E	EV-BT840X/XE
1K price, ea.	\$4.46/\$3.43	\$4.93/\$3.79	\$9.20	\$6.58	\$5.58	\$10.97
1K price, u.FL			\$9.55		\$6.52	\$11.34
Availability	production	production	production	production	production	Production

Bluetooth ranges in red color are measured in environments with Low Multiple Path Interference (at least 60% Fresnel zone clearance)

Bluetooth ranges in blue color are measured with antenna at 1.52 meters (5 feet, typical height of thermostat in the USA).

	Nordic BC Series, Compact				Nordic BM Series, Low Cost		nRF51
Modules	BC832	BC840	BC840M	BC840E	BM832A	BM832/E	BT600I
Sizes, mm	7.8x8.8x1.3	7.1x9.2x1.5	7(10)x12.2x1.5	7.0x12.2x1.8	10.2x15x1.9	10.2x15x1.9	12x30x3.0
Bluetooth Ver.	5	5	5	5	5	5	4.2
SoC	nRF52832	nRF52840	nRF52840	nRF52840	nRF52810	nRF52832	nRF51822
Flash/RAM	512KB/64KB	1MB/256KB	1MB/256KB	1MB/256KB	192KB/24KB	512KB/64KB	128KB/16KB
NFC	Yes	Yes	Yes	Yes	No	Yes	No
IEEE 802.15.4	No	Yes	Yes	Yes	No	No	No
GPIO pins	30	48	48	48	32	32	31
Pins	36, CAS/LGA	64, LGA	64, LGA	64, LGA	47, LGA	47, LGA	44, PAD
Antenna	chip	PCB Trace	PCB Trace	u.FL	PCB trace	PCB trace	chip
Range, 1Mbps	50 meters			1150 meters	340 meters	340 meters	30 meters
Ant at 1.52 m		4 meters	135 meters	850 meters	270 meters	270 meters	
peak current RX	5.4 mA	6.4 mA	6.4 mA	6.4 mA	5.4 mA	5.4 mA	13 mA
peak current TX	7.5mA, +4dBm	13.6mA+8dBm	13.6mA+8dBm	13.6mA+8dBm	7.5mA, +4dBm	7.5mA, +4dBm	10.5mA, 0dBm
DCDC inductors	Ext.	Integrated	Integrated	Integrated	Integrated	Integrated	
32.768kHz crystal	Ext.	Ext.	Ext.	Ext.	Ext.	Ext.	Ext.
Certifications	FCC, IC, CE, QDID	FCC, IC, CE, JPAU, QDID	FCC, IC, CE, JPAU, QDID	FCC, IC, CE, JPAU, QDID	FCC, IC, CE, JPAU, KR, QDID	FCC, IC, CE, JPAU, KR, QDID	FCC, IC, CE, JP, AU
Eval board	EV-BC832	EV-BC840	EV-BC840M	EV-BC840M	EV-BM832A	EV-BM832/E	EV-BT600I
1K price, ea.	\$5.74	\$6.30	\$7.38	\$7.44	\$3.00	\$3.92/\$4.08	\$3.99
Availability	production	Production	Production	Production	Production	Production	production



LTE , BLE 5/5.1/5.2, 802.15.4 Modules, M.2 Connector

LTE-M/NB-IoT Module.

An u.FL connector for external LTE antenna. A nano SIM card connector on board and SIM interface for external eSIM. GPS with integrated antenna and receiver amplifier, or an u.FL for external GPS antenna.

LTE-BLE/802.15.4 Combo Module

nRF52840 or nRF5340 module integrated with nRF9160 module. Bluetooth range can be > 4500 meters or 2.8 miles.

BLE/802.15.4 Module

nRF52840 or nRF5340 with to without power amplifier

LoRa-BLE 5.1 Combo Module

nRF52833 and Semtech SX1262 combo module supporting BLE 5.1 and Long Range LoRa.

M.2 Connector

B key, 67 pins.

LTE Modules and LTE-BLE Combo Modules, M.2 Connector

Module	LN60E40F	LN60E840E	LN60G840F	LN60G840X	LN60E	LN60G
BLE module	BT40F	BT840E	BT840F	BT840X	None	None
LTE module	nRF9160 SICA	nRF9160 SICA	nRF9160 SICA	nRF9160 SICA	nRF9160 SICA	nRF9160 SICA
LTE antenna	u.FL	u.FL	u.FL	u.FL	u.FL	u.FL
GPS antenna	u.FL	u.FL	Integrated	Integrated	u.FL	Integrated
Size, mm	30x42	30x42	30x42	30x42	30x42	30x42
Certifications						
QDID		108621	108621	108621		
Availability		Sample 3Q2020	Sample 3Q2020	Sample 3Q2020	Sample 3Q2020	Sample 3Q2020

BLE Modules, M.2 Connector

Module	M240E	M240X	M2840E	M2840X	M2840XE
BLE module	BT40E	BT40X	BT840E	BT840X	BT840XE
Size, mm	22x42	22x42	22x42	22x42	22x42
Certifications					
QDID			108621	108621	108621
Availability			Sample 3Q2020	3Q2020	3Q2020