BLE 5.2, 802.15.4 Modules, BT40/F/E/X/XE

Ver 1.00, May 2021

BluNor BT40F is a powerful, highly flexible, ultra low power Bluetooth Low Energy (BLE) using Nordic nRF5340 SoC. With a dual core ARM Cortex™ M33 MCU, embedded 2.4GHz multi-protocol transceiver, and an integrated PCB trace antenna or u.FL connector for an external antenna. It allows faster time to market with reduced development cost. BT40E is certified with ANT060, a 6dBi antenna in all regions. It has the best receiver sensitivity in worldwide market.



No external component needed to minimize host PCB area: Both 32 MHz and 32.768 KHz, -40°C to +105°C, 20 PPM crystals are integrated. DCDC inductors for VDD and VDDH are integrated.

Specifications:

- nRF5340 QKAA, dual core ARM® Cortex M33
- Application Core
  - 128/64 MHz Cortex M33 with FPU and DSP instructions
  - 1MB flash, 512KB RAM
  - 8KB 2-way set associate cache
  - ARM® TrustZone® Cryptocell-312 co-processor
- Network core:
  - 64 MHz Cortex M33 with 2KB instruction cache
  - 256KB flash, 64KB RAM
  - 2.6 mA in RX and 3.2 mA in 0dBm TX
  - Receiver Sensitivity: -98 dBm at 1Mbps.
  - TX power: programmable +3dBm to -20dBm
  - BLE 5.2 data rate: 2Mbps, 1Mbps, 500kbps, 125kbps.
  - IEEE 802.15.4 data rate: 250 Kbps
  - 2.4 GHz proprietary data rate: 2 Mbps, 1 Mbps
- DC-DC converter, inductors for VDD, VDDH on board.
- Direct powered by Lithium batteries or USB supply (up to 5.5V)
- Serial Wire Debug (SWD)
- Over-the-Air (OTA) firmware update
- 48 General purpose I/O pins
- USB 2.0 full speed (12 Mbps) controller
- QSPI interface
- Type 2 NFC-A tag with wake-on field, Touch-to-pair support
- Programmable peripheral interconnect (PPI)
- 12 bit/200 Ksps ADC, 8 configurable channels with programmable gain
- Temperature sensor
- Up to 3x pulse width modulator (PWM)
- Audio peripherals: I²S, digital microphone interface (PDM)
- 5 x 32 bit timers with counter mode
- Up to 3x SPI masters/3x SPI slaves
- Up to 2x I²C compatible 2-wire masters/slaves
- 2x UART (CTS/RTS)
- Quadrature Demodulator (QDEC)
- 2x real time counters (RTC)
- Hybrid pins: 16 castellated and 45 LGA.
- Both 32 MHz and 32.768KHz crystals on board
- Integrated PCB trace antenna or u.FL connector
- Operation voltage: 1.7V to 5.5V
- QDID: 119517

Application Examples

- BLE-LTE M.2 module: **LN60E40F**.
- BLE-LoRa M.2 module: **M262X40F**.
- BLE-LTE gateway: **BLG40F**.
- BLE-LTE/WiFi/PoE IP65 gateway: **LEW40E6P**.
- BLE-LTE IP65 sensor: **SL40F6**.

Model Summaries

module	BT40F	BT40	BT40E	BT40X
SoC	nRF5340 QKAA	nRF5340 QKAA	nRF5340 QKAA	nRF5340 + nRF21540
Size	15x20.8x1.9mm	14x16x1.9mm	14x16x1.9mm	15x28.0x1.9mm
32 MHz and 32.768 kHz crystals	Integrated	Integrated	Integrated	Integrated
DC converter inductors, VDD,VDDH	Integrated	Integrated	Integrated	Integrated
BT Antenna	PCB trace	PCB trace	u.FL	PA+PCB trace/u.FL
Max TX	+3.41 dBm	+3.41 dBm	+3.41 dBm	
Operating temp.	-40°C to +105°C	-40°C to +105°C	-40°C to +105°C	-40°C to +105°C
FCC ID	X8WBT40F	X8WBT40F	X8WBT40F	
ISED ID	4100A-BT40F	4100A-BT40F	4100A-BT40F	
CE	Compliant	Compliant	Compliant	
RCM	Compliant	Compliant	Compliant	
TELEC	201-210217	201-210217	201-210217	
Evaluation board	EV-BT40F	EV-BT40	EV-BT40E	
Availability	Production	Production	Production	

Table Of Contents

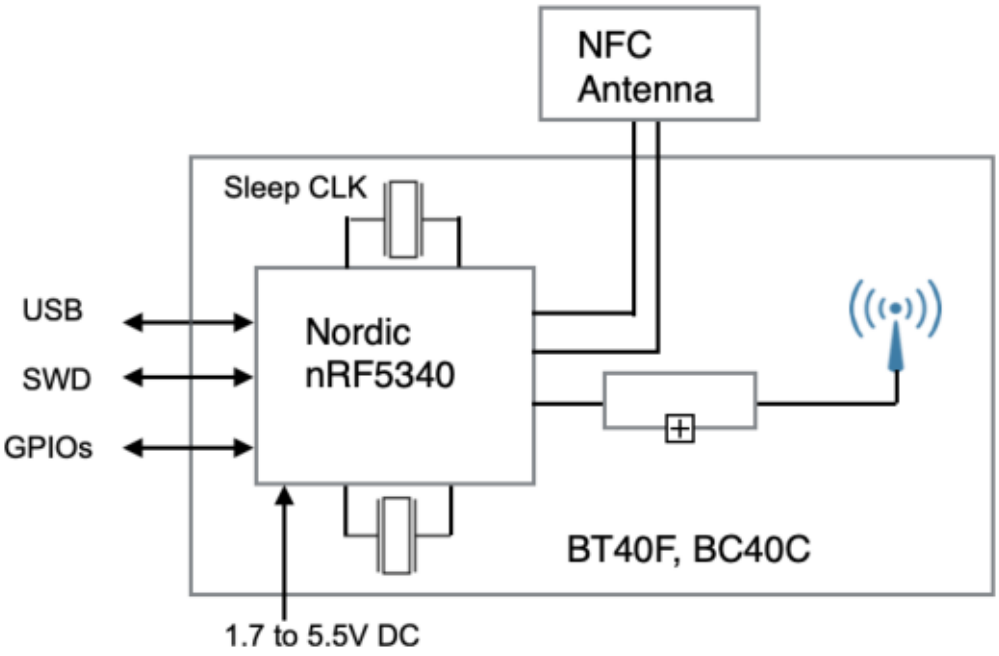
1. Introduction....3
BT40F Block Diagram....3
BT40X Block Diagram....4
2. Codes Development Using Nordic Tools....5
Over-The-Air DFU....5
nRF Connect SDK....5
Development Tools....5
3. Product Descriptions....6
Block Diagram of nRF5340....6
Mechanical Drawings....8
Pin Assignments of BT40....11
Pin Function....12
Mounting BT40F on the Host PCB....14
Host Board Design for Low Cost or Long Range....15
Control Nordic nRF21540 Power Amplifier....16
4. BT40F Evaluation Board....17
Nordic Development Tools....18
Android OS Apps....18
iOS Apps....18
EV-BT40F EvaluationBoard Schematics....19
Suggestion for Battery Power Application....20
5. Miscellaneous....21
Soldering Temperature-Time Profile for Re-Flow Soldering....21
Cautions, Design Notes, and Installation Notes....21
Packaging and Lot Number....25
FCC Label....25
Revision History....26
Contact Us....27

1. Introduction

BluNor BT40F Series are powerful, highly flexible, ultra low power wireless modules using Nordic nRF5340 SoCs. With a dual core ARM Cortex™ M33 MCU, embedded 2.4GHz multi-protocol transceiver, and an integrated antenna, it allows faster time to market with reduced development cost.

BT40F Block Diagram

The following is a block diagram of BT40F. Antenna circuit and main clock are integrated. All 48 GPIOs of nRF5340 can be accessed from main board. Connection to an external NFC (Near Field Communication) antenna is provided.



BlurNor BT40F is a sister module of BT840F, an nRF52840 module. The physical size is the same.

There are 3 modules in the BT40F Series.



BT40F

- Uses an nRF5340 QIAA with dual core Cortex M33 MCU
- Supports NFC
- Integrated high performance PCB trace antenna.
- Size: 15x20.8x1.9mm

BT40

- Uses an nRF5340 QIAA with dual core Cortex M33 MCU
- Integrated PCB trace antenna.
- Size: 14x16x1.9mm.

BT40E

- Uses an nRF5340 QIAA with dual core Cortex M33 MCU
- An u.FL connector for external antenna.
- Size: 14x16x1.9mm.

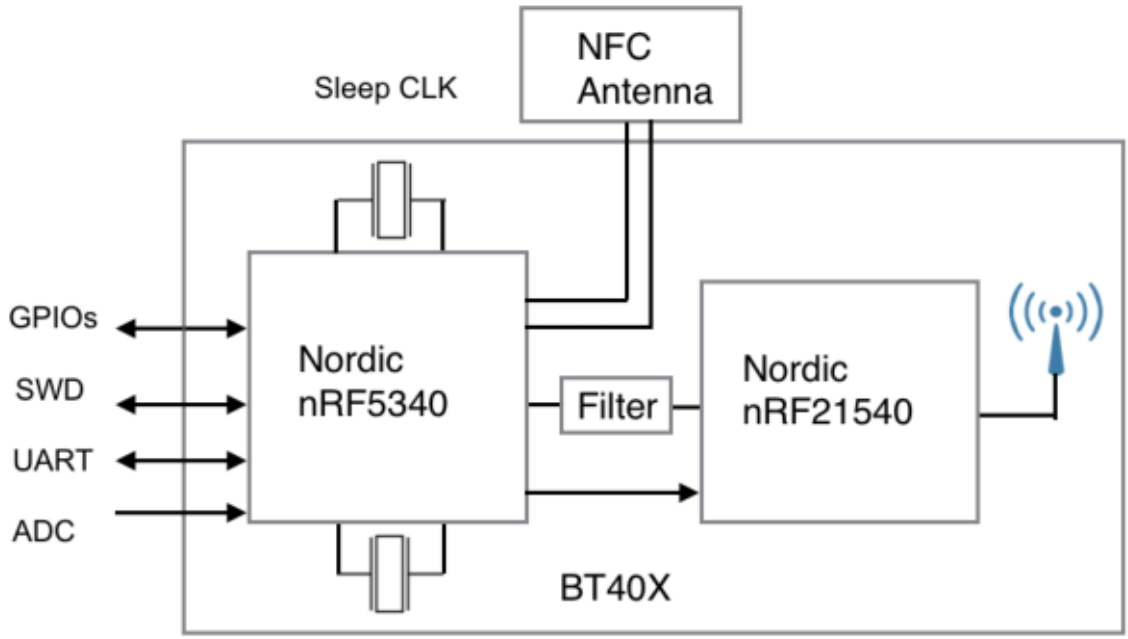


- Passes FCC, ISED, CE, RCM, TELEC testings with ANT060, a 6 dBi antenna.
- BT40E with ANT060 has the best receiver sensitivity.



BT40X Block Diagram

A Nordic nRF21540 power amplifier is integrated with nRF5340 SoC in BT40X module.



BT40X

- Uses an nRF5340 QKAA with dual core Cortex M33 MCU
- Supports NFC
- Integrated Nordic nRF21540 power amplifier
- Integrated 32.768 KHz sleep crystal
- Integrated PCB trace antenna with an u.FL connector for external antenna
- Size: 15x28x1.9mm..

2. Codes Development Using Nordic Tools

Development tools from Nordic and other third party development tools recommended by Nordic should be used.

Over-The-Air DFU

The nRF5340 is supported by an Over-The-Air Device Firmware Upgrade (OTA DFU) feature. This allows for in the field updates of application software and SoftDevice.

nRF Connect SDK

nRF Connect SDK is a scalable and unified software development kit for building products based on all our nRF52, nRF53 and nRF91 Series wireless devices. It offers developers an extensible framework for building size-optimized software for memory-constrained devices as well as powerful and complex software for more advanced devices and applications. It integrates the Zephyr RTOS and a wide range of samples, application protocols, protocol stacks, libraries and hardware drivers.

For developing Bluetooth Low Energy, Thread and Zigbee products, the nRF Connect SDK contains all needed software, including protocol stacks. For developing cellular IoT products it contains everything except the LTE modem firmware that must be downloaded separately from the nRF9160 SiP product page. See the cellular IoT software for more details.

nRF Connect SDK also offers an unique integration of HomeKit Accessory Development Kit for developing products using both HomeKit over Thread and HomeKit over Bluetooth Low Energy. It is a highly optimized solution that enables battery-powered products with both the HomeKit Accessory Protocol (HAP) and application firmware running on a single chip. MFi licensees can get access to the HomeKit repository by contacting us via Nordic DevZone private ticket.

nRF Connect SDK offers a single code base for all our devices and software components. It simplifies porting modules, libraries and drivers from one application to another, thus reducing development time. By enabling developers to pick and choose the essential software components for their application, high memory efficiency is guaranteed.

nRF Connect SDK is publicly hosted on GitHub, offers source code management with Git and has free SEGGER Embedded Studio IDE support. Nordic runs continuous integration tests on the nRF Connect SDK code to ensure robust and secure production quality code.

Development Tools

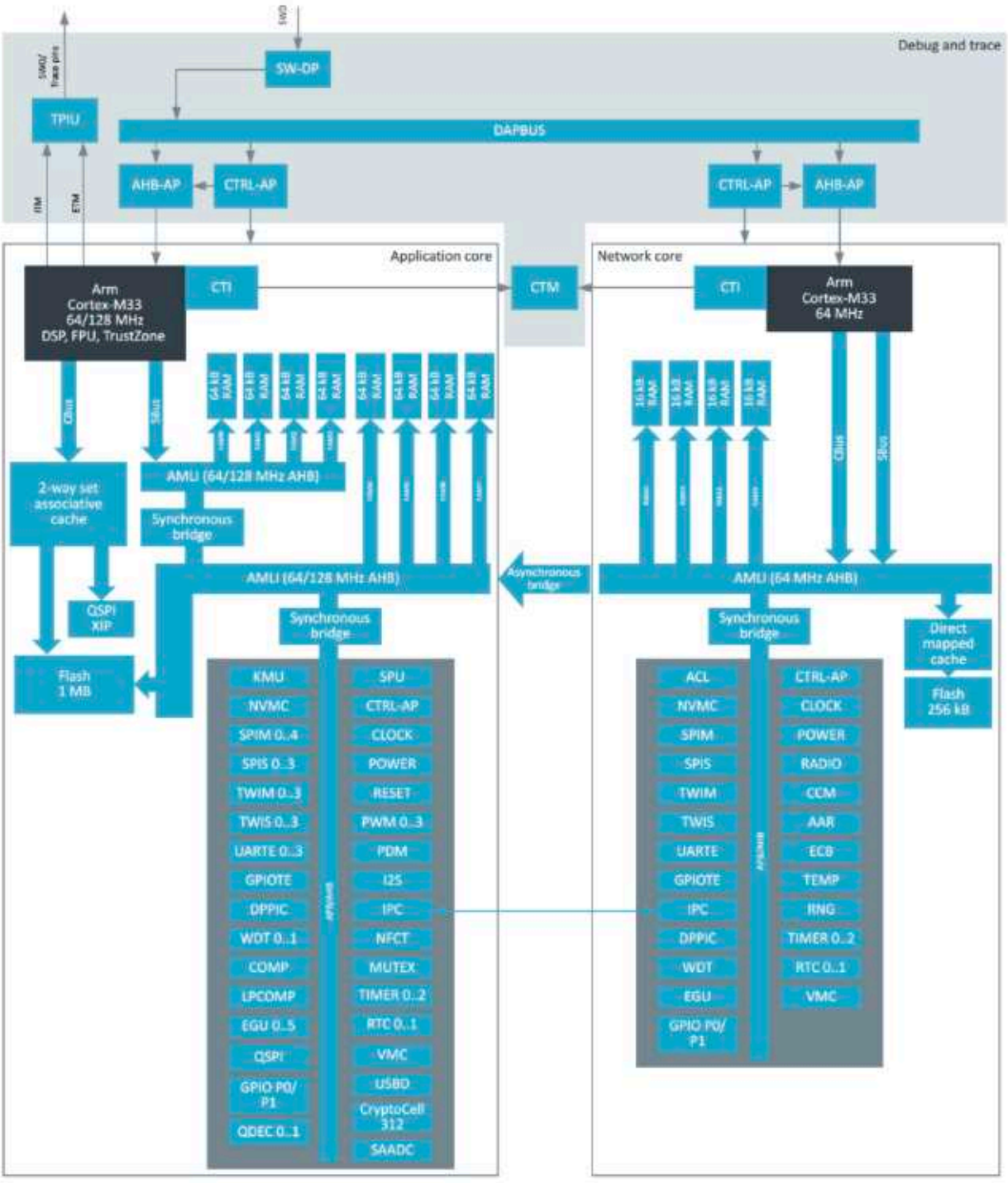
Nordic Semiconductor provides a complete range of hardware and software development tools for the nRF53 Series devices. nRF53 DK board is recommended for firmware development.

Nordic software development tools can be downloaded.

3. Product Descriptions

Block Diagram of nRF5340

The following is a block diagram of Nordic nRF5340 Bluetooth Low Energy (BLE) SoC. Please visit Nordic website for **full description and product specifications**.



nRF5340 is a wireless ultra-low power multiple core System on Chip (SoC) integrating two fully programmable Arm Cortex M33 processors, advanced security features, a range of peripherals, and a multiprotocol 2.4 GHz

transceiver. The transceiver supports Bluetooth low energy, ANT™, and 802.15.4 and allows the implementation of proprietary 2.4 GHz protocols.

The two Arm Cortex M33 processors share the power, clock, and peripheral architecture with Nordic Semiconductor nRF51, nRF52, and nRF91 Series of PAN/LAN SoCs, ensuring minimal porting efforts. The application core is a full-featured Arm Cortex M33 processor including DSP instructions and FPU and running at up to 128 MHz with 1MB of flash and 512 KB of RAM. The option to run the application processor at 64 MHz allows th eCPU to increase energy efficiency. The network core is an Arm Cortex M33 processor with a reduced feature set, designed for ultra-low power operation. It runs at a fixed 64 MHz frequency and contains 256 KB of flash and 64 KB of RAM.

The peripheral set offers a variety of analog and digital functionality enabling single chip implementation of a wide range of applications. Arm trustZone technology, Arm cryptoCell-312, and supporting blocks for ysytem protection and key management are embedded for the advanced security needed for IoT applications.

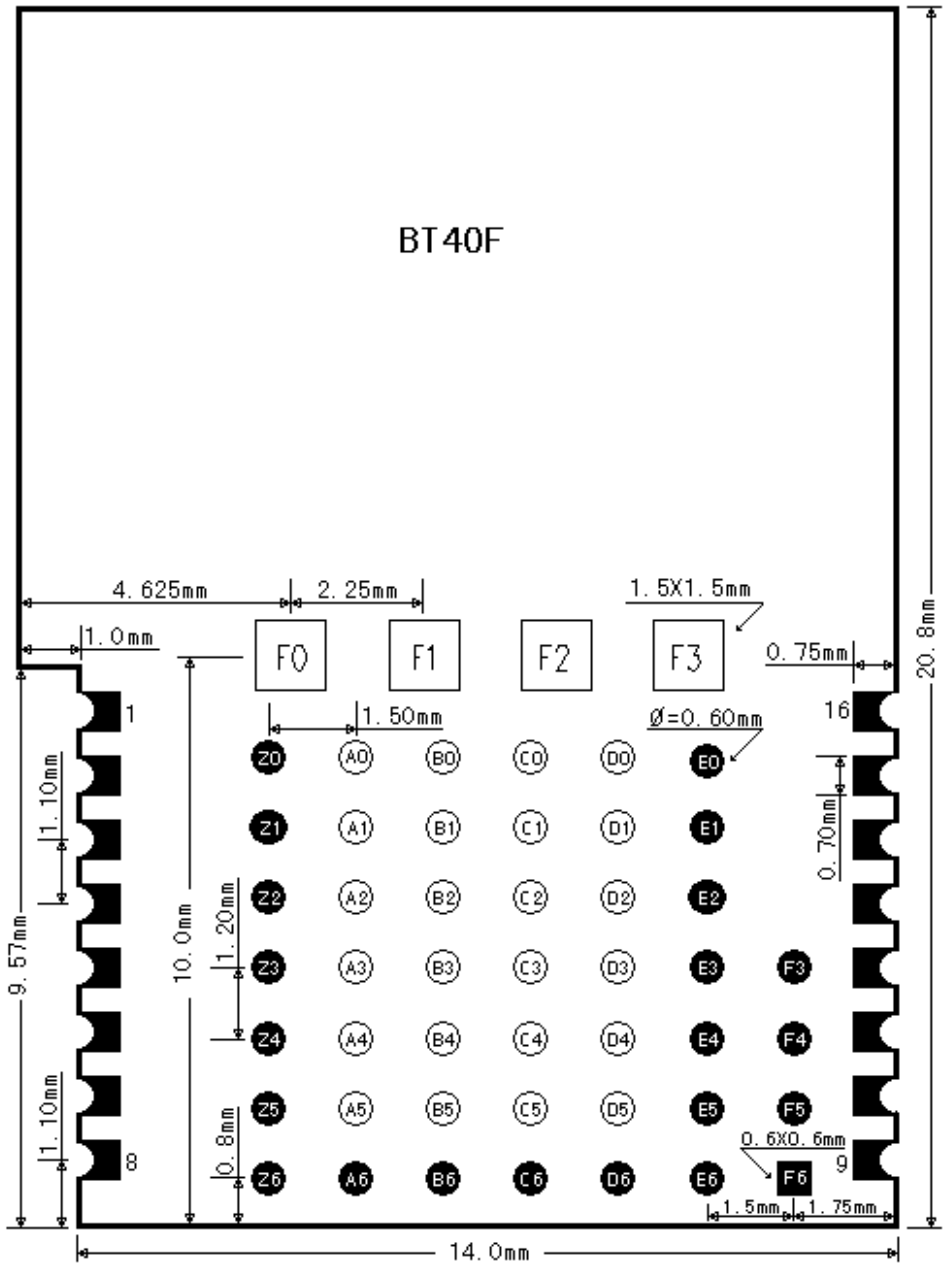
Mechanical Drawings

Mechanical drawings of BT40F, BT40, and BT40E is identical to that of BT840F, BT840, and BT840E, respectively.

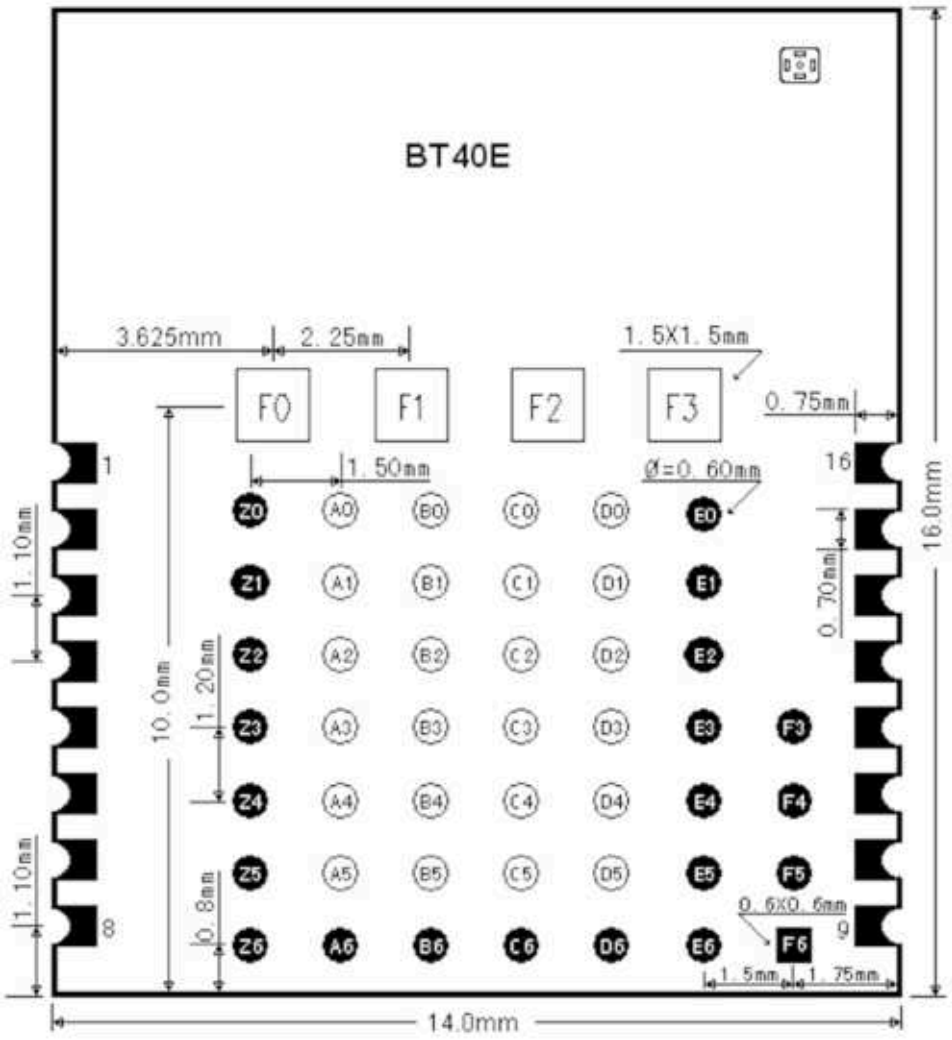
Two types of pins are available to meet different application requirements.

- 16 castellated pins for application needing limited number of IOs. SMT equipment is not required for soldering castellated pins.
- 45 LGA (Land Grid Array) pins to access all 48 GPIOs of nRF52840 when needed.

BT40F mechanical drawings, top view



BT40 and BT40E mechanical drawings, top view.

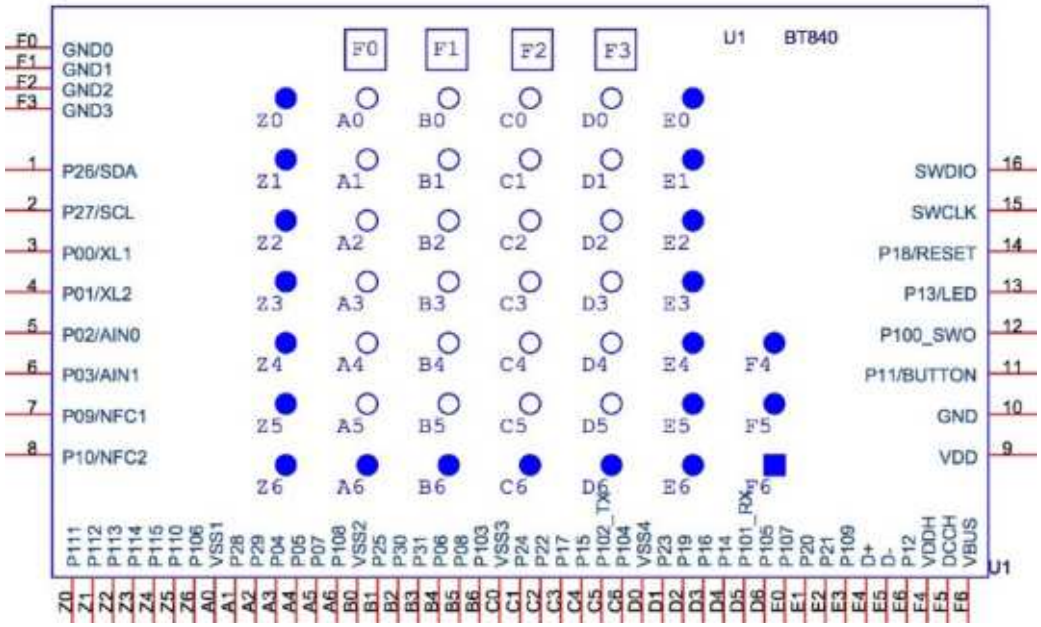


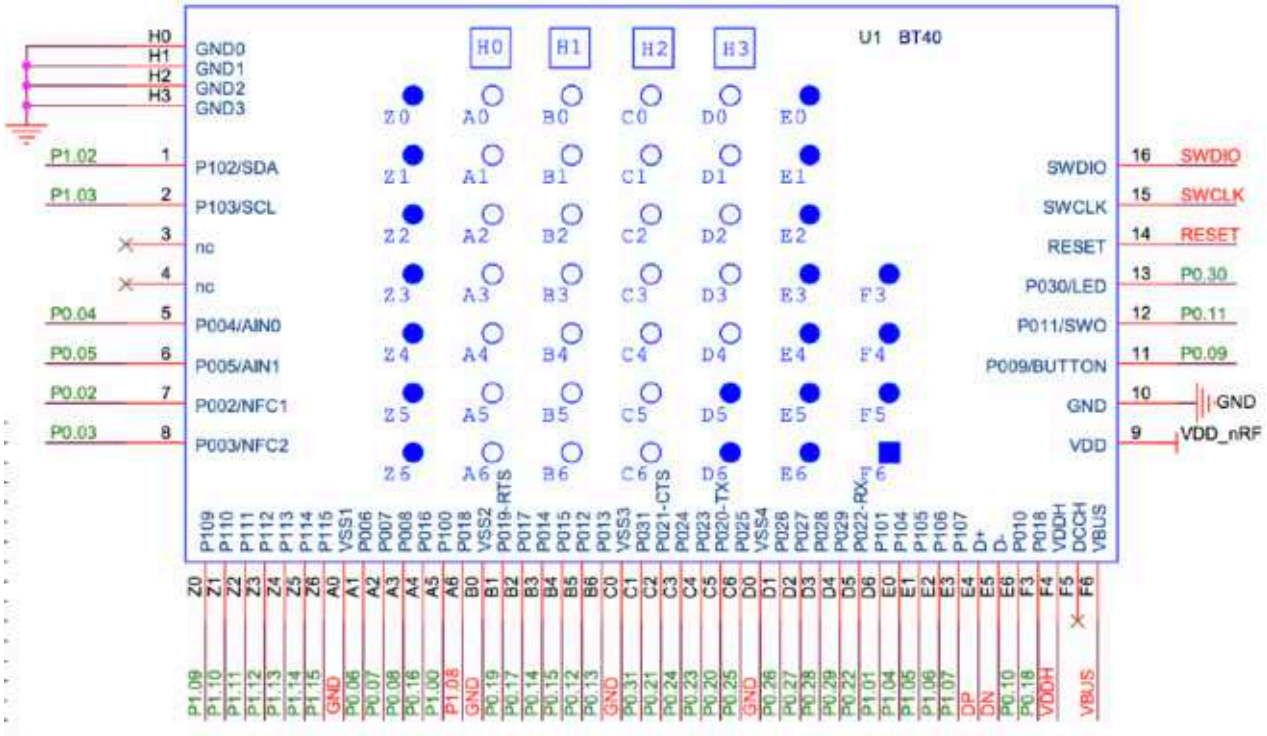
BT40X mechanical drawings, top view

Pin Assignments of BT40

The followings are BT40 pin assignment. Pin functions are in a table in next section. Please refer to Nordic **nRF5340 Product Specifications** for detailed descriptions and features supported.

BT840F and BT40F have compatible footprints. Pin assignments are below. Firmware configuration is required to upgrade module on the PCB.





Pin Function

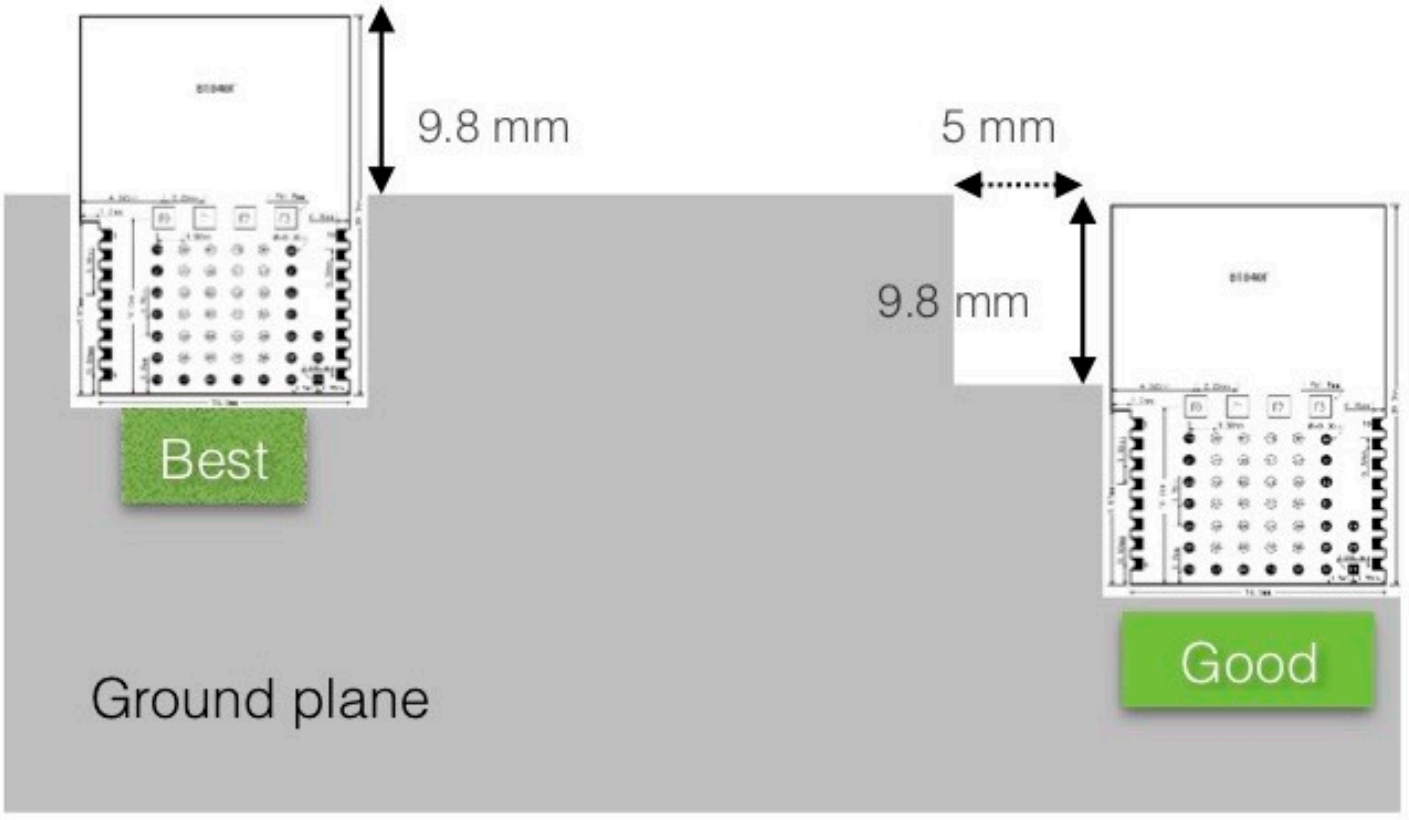
BT840	52840		BT40	nRF5340		
pin#	pin#	pin name	pin#	pin#	pin name	Descriptions
1	G1	P0.26/SDA	1	AE1	P1.02	GPIO, configured as I2C SDA on EV board
2	H2	P0.27/SCL	2	AF2	P1.03	GPIO, configured as I2C SCL on EV board
3	D2	P0.00/XL1	3	N1	NC	BT840F, external 32.768 KHz crystal connection; BT40F, NC, 32.768 KHz crystal embedded.
4	F2	P0.01/XL2	4	R1	NC	BT840F, external 32.768 KHz crystal connection; BT40F, NC, 32.768 KHz crystal embedded.
5	A12	P0.02/AIN0	5	V2	P0.04/AIN0	GPIO, Analog input
6	B13	P0.03/AIN1	6	Y2	P0.05/AIN1	GPIO, Analog input
7	L24	P0.09/NFC1	7	W1	P0.02/NFC1	GPIO, NFC antenna connection
8	J24	P0.10/NFC2	8	AA1	P0.03/NFC2	GPIO, NFC antenna connection
9	B1	VDD	9	A19	VDD	DC supply 1.7V to 3.6V
10	B7	GND	10	A25	VSS	Ground
11	T2	P0.11	11	AJ1	P0.09/MOSI	GPIO; BT40F, high speed SPI_MOSI.
12	AD22	P1.00	12	AK4	P0.11	GPIO
13	AD8	P0.13	13	B24	P0.30	GPIO
14	AC13	P0.18/RESET	14	AC31	/RESET	GPIO, reset with internal pull up, active low.
15	AA24	SWDCLK	15	W31	SWDCLK	Serial Wire Debug clock input
16	AC24	SWDIO	16	AA31	SWDIO	Serial Wire Debug I/O
Z0	B19	P1.11	Z0	AK26	P.109	GPIO
Z1	B17	P1.12	Z1	R31	P1.10	GPIO
Z2	A16	P1.13	Z2	B20	P1.11	GPIO
Z3	B15	P1.14	Z3	B18	P1.12	GPIO
Z4	A14	P1.15	Z4	A17	P1.13	GPIO
Z5	A20	P1.10	Z5	B16	P1.14	GPIO
Z6	R24	P1.06	Z6	B14	P1.15	GPIO
A0		GND	A0	A25	VSS	Ground
A1	B11	P0.28/AIN4	A1	AB2	P0.06/AIN2	GPIO, Analog input
A2	A10	P0.29/AIN5	A2	AD2	P0.07/AIN3	GPIO, Analog input
A3	J1	P0.04/AIN2	A3	AH2	P0.08/SCK	GPIO, BT840F, analog input; BT40F, high speed SPI clock
A4	K2	P0.05/AIN3	A4	AL9	P0.16/IO3	GPIO, BT840F, analog input; BT40F, high speed SPI IO3
A5	M2	P0.07	A5	M2	P1.00	GPIO
A6	P2	P1.08	A6	AL23	P1.08	GPIO
B0		GND	B0		VSS	Ground
B1	AC21	P0.25	B1	AL13	P0.19	GPIO
B2	B9	P0.30/AIN6	B2	AK12	P0.17/SCK	GPIO, BT840F, analog input; BT40F, QSPI clock.
B3	A8	P0.31/AIN7	B3	AK8	P0.14/IO1	GPIO, BT840F, analog input; BT40F, QSPI IO1
B4	L1	P0.06	B4	AK10	P0.15/IO2	GPIO, NC for BT840X; BT40F, QSPI IO2
B5	N1	P0.08	B5	AK6	P0.12/DCX	GPIO, NC for BT840X; BT40F, high speed SPI DCX.
B6	V23	P1.03	B6	AL5	P0.13/IO0	GPIO, BT40F, QSPI IO0
C0		GND	C0		VSS	Ground
C1	AD20	P0.24	C1	B22	P0.31	GPIO
C2	AD18	P0.22	C2	AL15	P0.21	GPIO

C3	AD12	P0.17	C3	AL27	P0.24	GPIO, NC for BT840X,BT840XE, PA control
C4	AD10	P0.15	C4	AK20	P0.23	GPIO
C5	W24	P1.02	C5	AK16	P0.20	GPIO
C6	U24	P1.04	C6	AK28	P0.25/AIN4	GPIO, BT40F, analog input.
D0		GND	D0		VSS	Ground
D1	AC19	P0.23	D1	AL29	P0.26/AIN5	GPIO, BT40F, analog input.
D2	AC15	P0.19	D2	AK30	P0.27/AIN6	GPIO, NC for BT840 X; BT40F, analog input
D3	AC11	P0.16	D3	AE31	P0.28/AIN7	GPIO, BT40F, analog input.
D4	AC9	P0.14	D4	U31	P0.29	GPIO
D5	Y23	P1.01	D5	AK18	P0.22	GPIO
D6	T23	P1.05	D6	P2	P1.01	GPIO
E0	P23	P1.07	E0	AL19	P1.04	GPIO
E1	AD16	P0.20	E1	AK22	P1.05	GPIO
E2	AC17	P0.21	E2	AL21	P1.06	GPIO
E3	R1	P1.09	E3	AK24	P1.07	GPIO
E4	AD6	D+	E4	B2	D+	USB D+
E5	AD4	D-	E5	B4	D-	USB D-
E6	U1	P0.12	E6	AK2	P0.10/MISO	GPIO, BT40F, high speed SPI MISO
F0			H0			Ground pad
F1			H1			Ground pad
F2			H2			Ground pad
F3			H3			Ground pad
			F3	AK14	P0.18/CSN	GPIO, BT40F, QSPI chip select
F4	Y2	VDDH	F4	E1	VDDH	High Voltage Power Supply, 2.5V to 5.5V
F5	AB2	DCCH	F5	J1	NC	BT840F, DCDC converter output; BT40F, No connect, L,C circuit embedded.
F6	AD2	VBUS	F6	A5	VBUS	5V DC power for USB 3.3V regulator

Mounting BT40F on the Host PCB

The following figure shows recommended mounting of BT40F module on the host PCB.

- For the best Bluetooth range performance, the antenna area of module shall extend 9.8 mm outside the edge of host PCB board, or 9.8 mm outside the edge of a ground plane.
- The next choice is to place a module on a corner of host PCB, the antenna area shall extend 9.8 mm from the edge of ground plane. Ground plane shall be at least 5 mm from the edge of the antenna area of module.
- We don't recommend mounting BT40F module in the middle of a host PCB.



For the best Bluetooth range performance, keep all external metal at least 30mm from the antenna area.

Host Board Design for Low Cost or Long Range

On nRF53 series SoCs, Nordic offers various memory options and protocol supports. Fanstel offers various antenna and power amplifier options. A host board can be designed to accommodate these nRF53 modules. Our suggestions for host PCB design:

If your main goal is minimum PCB cost,

- use a 2-sided PCB.
- Use library component from EV-BT40F Gerber files, can be downloaded from http://www.fanstel.com/download-document/. It has 16 castellated pins plus 24 LGA pins. BT40F library component can be used. However, signal routing can be difficult on a 2-sided PCB.
- Be sure of no metal contact in the area of 21 additional BT40F pins.
- BT40F can be mounted on a BT840F pad.

If you main goal is maximum wireless range,

- use a 4 or more layers PCB.
- Use library component from EV-BT40F Gerber files. They can be downloaded from http://www.fanstel.com/download-document/. It has 16 castellated pins plus 45 LGA pins.
- As much ground plane under BT40F, on top side of host PCB as possible. Use EV-BT40F Gerber files as an example.
- If your products may need wireless range of 1350 meters or more, allocate physical space for a 15x28x1.9mm module. This larger module size is required to accommodate Nordic nRF21540 power amplifier.
- ***(To be determined)*** Don't use P0.06 (BT840F pin B4), P0.17 (BT840F pin C3), and P0.19 (BT840F pin D2) on the host board. These pins are used to control SKY66112 power amplifier in BT840X and BT840XE.

Control Nordic nRF21540 Power Amplifier

BT40X uses nRF21540 power amplifier.

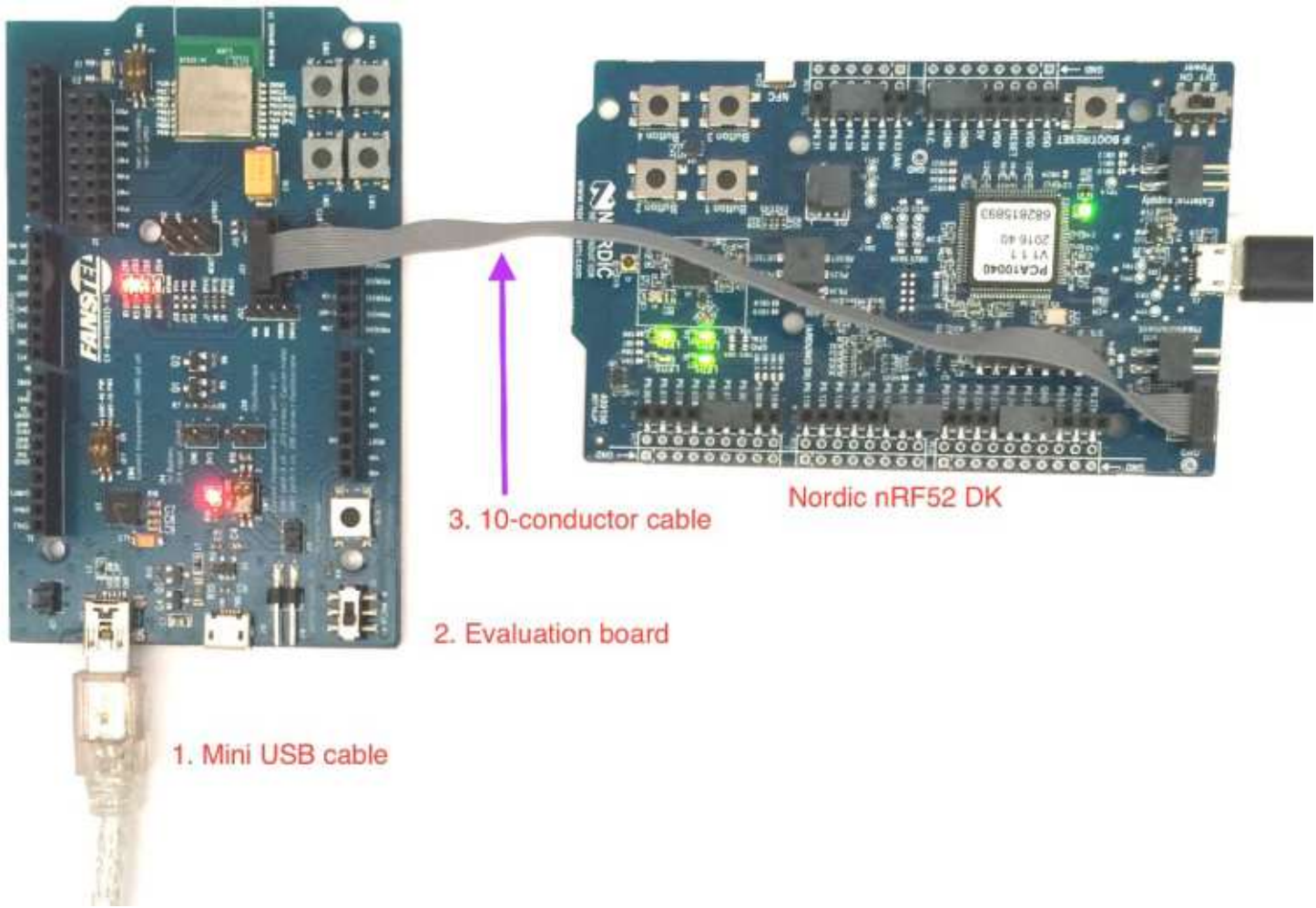
Control codes to be provided.

4. BT40F Evaluation Board

An evaluation board consists of the followings:

- Mini USB cable
- Evaluation board
- 10-conductor cable for connection to Nordic nRF53 DK (DK is not included)

The EV board can be programmed by using a Nordic nRF53 DK board, connected as below. (Photo to be updated)



Nordic Development Tools

A Nordic nRF5340 DK is recommended for programming this evaluation board. Visit Nordic website for **nRR5340 DK description and product brief**.

Many application examples can be downloaded from Nordic website.

Some firmware, Android OS, and iOS app codes can be downloaded from **Bluetooth 5 Codes section** of this Fanstel webpage.

http://www.fanstel.com/download-document/

BT40 firmware can be used in all nRF5340 modules without power amplifier, e.g., BT40F and BT40E.

Android OS Apps

The following Android OS apps are available for download from Google Play Store:
BlueNor nrf5x: to use with Bluetooth 5 stacks, AT commands, or Slave firmware. Master firmware does not connect to a smartphone. Source codes can be downloaded from http://www.fanstel.com/download-document/

BlueNor Mesh: to use with BlueNor mesh firmware to send command to any node in a mesh. Node number is displayed when acknowledgement is received. Source codes will be uploaded to Fanstel website when supporting Bluetooth 5.

iOS Apps

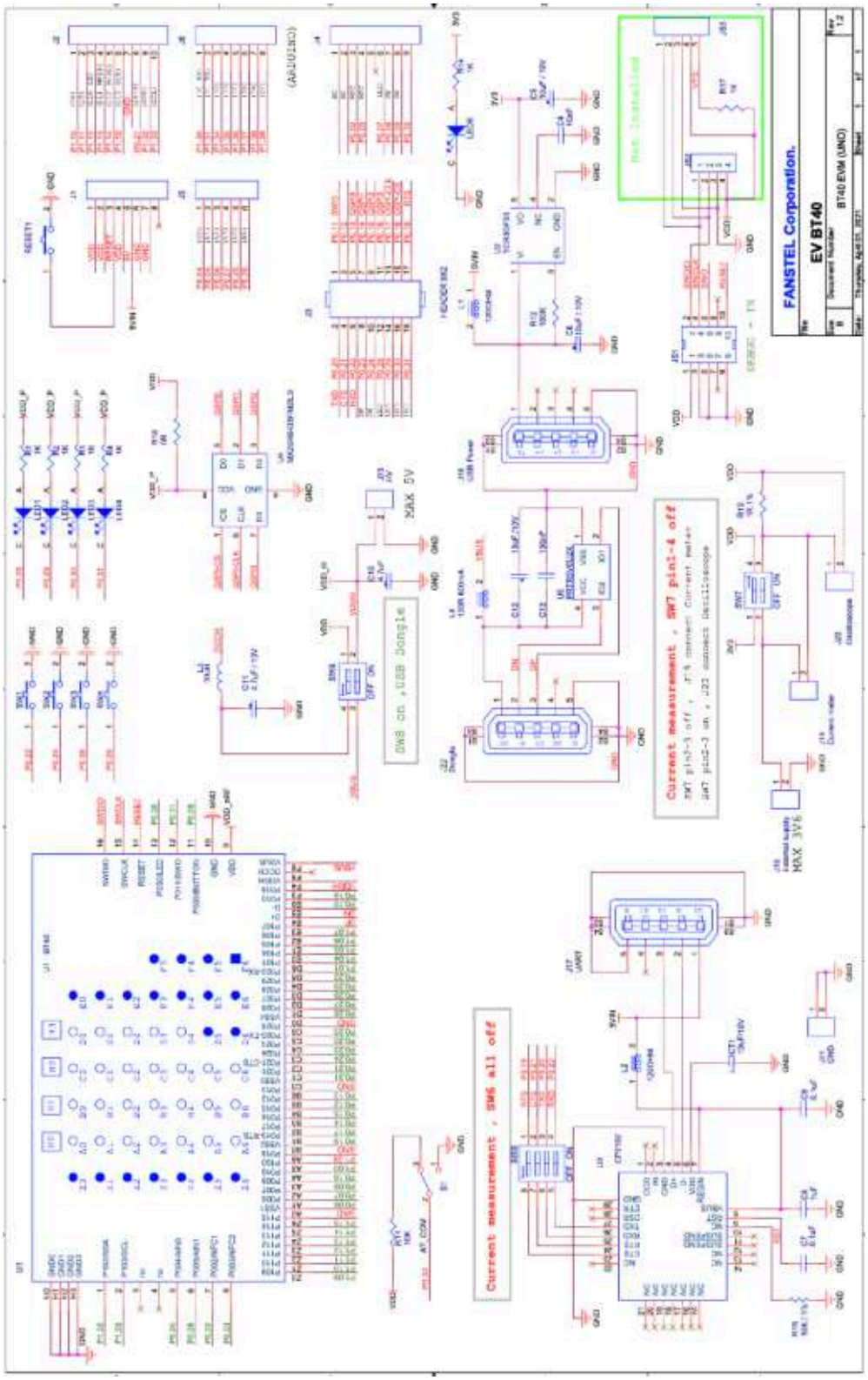
The following iOS apps can be downloaded from Apple APP Store.

BlueNor Mesh: to use with BlueNor mesh firmware to send command to any node in a mesh. Node number is displayed when acknowledgement is received.
BlueNor nrf5x firmware, apps, and source codes will be uploaded when ready.

EV-BT40F EvaluationBoard Schematics

Evaluation board **EV-BT40F schematics and Gerber files** is available at Fanstel website.

Evaluation board can be used as a reference design for using modules. EV-BT40F is designed for the BT40F soldering pads with 61 pins. This EV board can also be used for BT40, BT40E, and BT40X modules.



Suggestion for Battery Power Application

Standby current consumption is important for battery-powered product. To reduce host board area, the followings are embedded in modules:

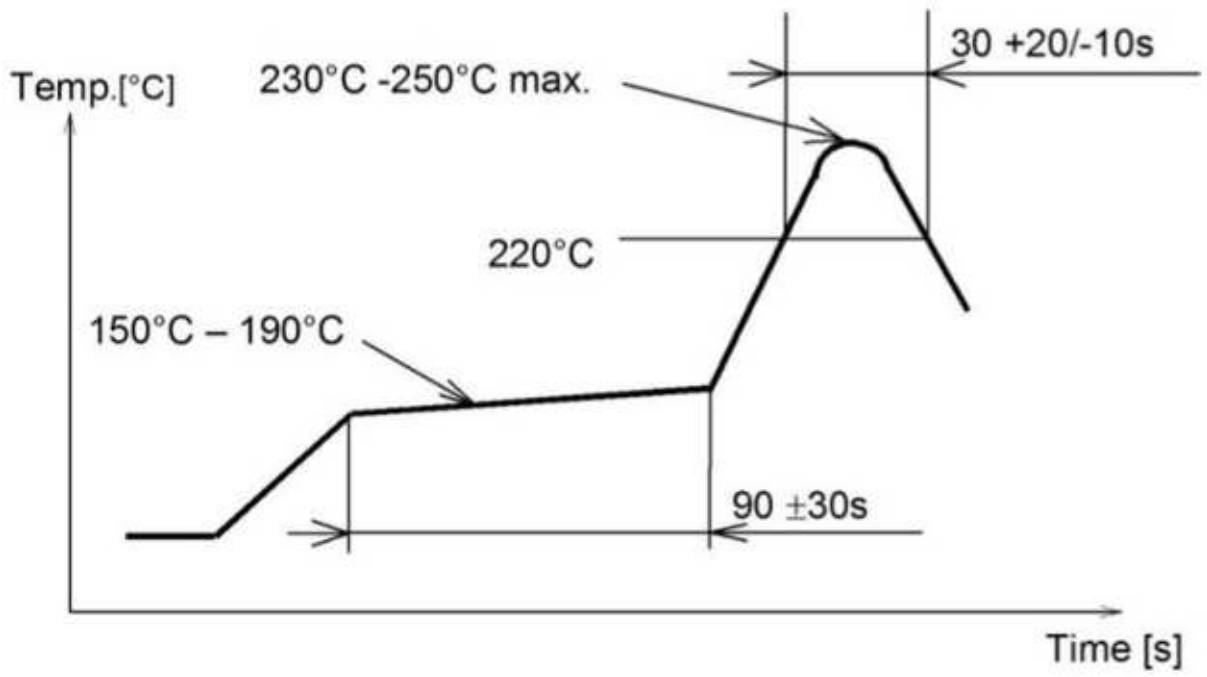
- 32 MHz, 20PPM main crystal and load capacitors.
- 32.768 KHz, 20PPM sleep crystal and load capacitors.
- Inductors and capacitors required for VDD power supply DC to DC converter.
- Inductors and capacitors required for VDDH power supply DC to DC converter.

The external sleep crystal shall be used for a precise sleep clock frequency. DCDC converter shall be enabled to reduce power consumption.

5. Miscellaneous

Soldering Temperature-Time Profile for Re-Flow Soldering

Maximum number of cycles for re-flow is 2. No opposite side re-flow is allowed due to module weight.



Cautions, Design Notes, and Installation Notes

Failure to follow the guidelines set forth in this document may result in degrading of the product's functions and damage to the product.

Design Notes

(1) Follow the conditions written in this specification, especially the control signals of this module.

(2) The supply voltage has to be free of AC ripple voltage (for example from a battery or a low noise regulator output). For noisy supply voltages, provide a decoupling circuit (for example a ferrite in series connection and a bypass capacitor to ground of at least 47uF directly at the module).

(3) This product should not be mechanically stressed when installed.

(4) Keep this product away from heat. Heat is the major cause of decreasing the life of these products.

(5) Avoid assembly and use of the target equipment in conditions where the products' temperature may exceed the maximum tolerance.

(6) The supply voltage should not be exceedingly high or reversed. It should not carry noise and/or spikes.

(7) this product away from other high frequency circuits.

Notes on Antenna and PCB Layout

(1) Don't use a module with internal antenna inside a metal case.

(2) For PCB layout:

- Avoid running any signal line below module whenever possible,
- No ground plane below antenna,
- If possible, cut-off the portion of main board PCB below antenna.

Installation Notes

(1) Reflow soldering is possible twice based on the time-temperature profile in this data sheets. Set up the temperature at the soldering portion of this product according to this reflow profile.

(2) Carefully position the products so that their heat will not burn into printed circuit boards or affect the other components that are susceptible to heat.

(3) Carefully locate these products so that their temperatures will not increase due to the effects of heat generated by neighboring components.

(4) If a vinyl-covered wire comes into contact with the products, then the cover will melt and generate toxic gas, damaging the insulation. Never allow contact between the cover and these products to occur.

(5) This product should not be mechanically stressed or vibrated when reflowed.

(6) If you want to repair your board by hand soldering, please keep the conditions of this chapter.

(7) Do not wash this product.

(8) Refer to the recommended pattern when designing a board.

(9) Pressing on parts of the metal cover or fastening objects to the metal will cause damage to the unit.

Usage Condition Notes

(1) Take measures to protect the unit against static electricity. If pulses or other transient loads (a large load applied in a short time) are applied to the products, check and evaluate their operation before assembly on the final products.

(2) Do not use dropped products.

(3) Do not touch, damage or soil the pins.

(4) Follow the recommended condition ratings about the power supply applied to this product.

(5) Electrode peeling strength: Do not add pressure of more than 4.9N when soldered on PCB

(6) Pressing on parts of the metal cover or fastening objects to the metal cover will cause damage.

(7) These products are intended for general purpose and standard use in general electronic equipment, such as home appliances, office equipment, information and communication equipment.

Storage Notes

(1)The module should not be stressed mechanically during storage.

(2)Do not store these products in the following conditions or the performance characteristics of the product, such as RF performance will be adversely affected:

- Storage in salty air or in an environment with a high concentration of corrosive gas.
- Storage in direct sunlight
- Storage in an environment where the temperature may be outside the range specified.
- Storage of the products for more than one year after the date of delivery storage period.

(3) Keep this product away from water, poisonous gas and corrosive gas.

(4) This product should not be stressed or shocked when transported.

(5) Follow the specification when stacking packed crates (max. 10).

Safety Conditions

These specifications are intended to preserve the quality assurance of products and individual components. Before use, check and evaluate the operation when mounted on your products. Abide by these specifications, without deviation when using the products. These products may short-circuit. If electrical shocks, smoke, fire, and/or accidents involving human life are anticipated when a short circuit occurs, then provide the following failsafe functions, as a minimum.

(1)Ensure the safety of the whole system by installing a protection circuit and a protection device.

(2)Ensure the safety of the whole system by installing a redundant circuit or another system to prevent a dual fault causing an unsafe status.

Other Cautions

(1)This specification sheet is copyrighted. Reproduction of this data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices.

(2)Do not use the products for other purposes than those listed.

(3)Be sure to provide an appropriate failsafe function on your product to prevent an additional damage that may be caused by the abnormal function or the failure of the product.

(4)This product has been manufactured without any ozone chemical controlled under the Montreal Protocol.

(5)These products are not intended for other uses, other than under the special conditions shown below. Before using these products under such special conditions, check their performance and reliability under the said special conditions carefully to determine whether or not they can be used in such a manner.

- In liquid, such as water, salt water, oil, alkali, or organic solvent, or in places where liquid may splash.

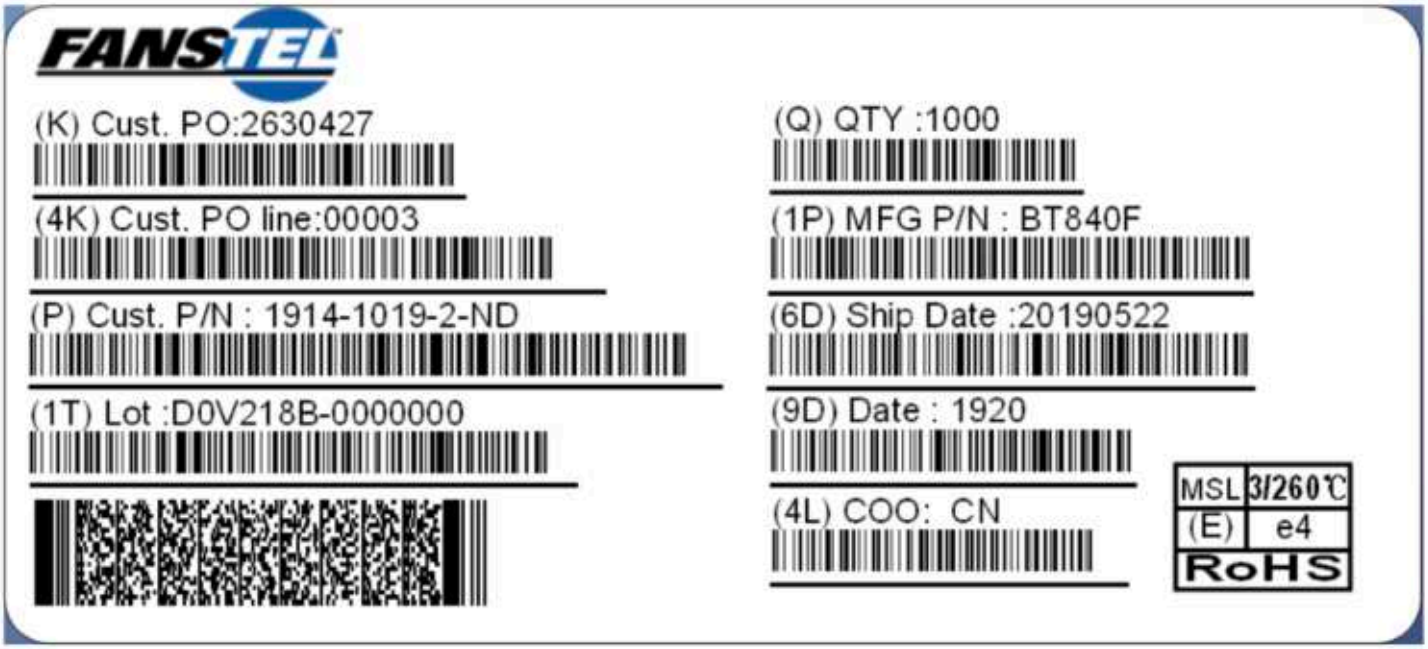
- In direct sunlight, outdoors, or in a dusty environment
- In an environment where condensation occurs.
- In an environment with a high concentration of harmful gas.

(6) If an abnormal voltage is applied due to a problem occurring in other components or circuits, replace these products with new products because they may not be able to provide normal performance even if their electronic characteristics and appearances appear satisfactory.

(7) When you have any question or uncertainty, contact Fanstel.

Packaging and Lot Number

Production modules are delivered in reel, 1000 modules in each reel. Lot number for modules made after May 2019, can be used to track silicon version of SoC, module PCB version, and production test code version.



Lot: **D0 V2 18B - 00 00 000**

D0: 2 digits, version number of SoC.
V2: 2 digits, version number of module PCB.
18B: the first 2 digits for production test codes released year and the last digit for month in hex format. A=October, B=November, C=December. 18B was released in November 2018.
00 00 000, 7 digits, reserved for 2nd SoC for modules with 2 SoCs.

FCC Label

The Original Equipment Manufacturer (OEM) must ensure that the OEM modular transmitter must be labeled with its own FCC ID number. This includes a clearly visible label on the outside of the final product enclosure that displays the contents shown below. If the FCC ID is not visible when the equipment is installed inside another device, then the outside of the device into which the equipment is installed must also display a label referring to the enclosed equipment

The end product with this module may subject to perform FCC part 15 unintentional emission test requirement and be properly authorized.

This device is intended for OEM integrator only.

Revision History

- Feb. 2020, Ver. 0.10: Initial release
- May 2020, Ver. 0.50: draft update
- Sep. 2020, Ver.0.60: draft update
- March 2021, Ver. 0.90: draft update
- April 2021, Ver. 0.92: Draft revision.
- May 2021, Ver.1.00: Add FCC and other certification information. Initial release.

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