INDIESEMIC

Datasheet

ISC-nRF5340-7002-A

An advanced multiprotocol ultra-low power BLE & Wi-Fi 6 Combo module -- V0.2

Table of Contents

1. Abbreviations

Abbreviations	Description
BLE	Bluetooth Low Energy
TX	Transmission
RX	Reception
FPU	Floating Point Unit
RSSI	Received Signal Strength Indication
AES	Advanced Encryption Standard
ECB	Electronic Codebook Mode Encryption
CCM	Cipher Block Chaining-Message Authentication Code
PWM	Pulse Width Modulation
AAR	Accelerated Address Resolver
DMA	Direct Memory Access
CTS	Clear to Send
RTS	Request to Send
PLL	Phase Locked Loop
GPIO	General Purpose Input Output
QSPI	Quad Serial Peripheral Interface
SPI	Serial Peripheral Interface
ADC	Analogue to Digital Convertor
NFC	Near Field Communication

Table: Acronym Description Table

2. General Description

The ISC-nRF5340-nRF7002-A is a powerful, highly flexible, ultra-low power Bluetooth Low Energy and Wifi 6 module using Nordic nRF5340 and nRF7002 SoC solution developed by Indiesemic Pvt Ltd.

WiFi + BLE Combo module that supports WiFi6 dual-frequency connection, 2.4G and 5G 1TR1, Maximum WiFi speed 86mbps, output Maximum power up to 3dBm, receiving current in 2.4G frequency region is 56mA, while in 5G frequency region is 58mA, meanwhile supports BLE master/slave mode and pass through mode, adopts WiFi and BLE independent design, no crosstalk.

3. Features

WiFi 6 Specifications	• Nordic nRF7002 SoC. • Low-power and secure Wi-Fi for the IoT • WiFi CERTIFIED 6TM, WiFi CERTIFIEDTM a/b/g/n/ac, WiFi Enhanced OpenTM • 2.4 GHz and 5 GHz dual-band or 2.4 GHz only • TX power from +21 dBm. • 191 mA @ max output power, 2.4 GHz, MCS7 ; 260 mA @ max output power, 5 GHz, MCS7 • 4.8 mA peak current in TX (0 dBm) • 60 mA RX 2.4 GHz, 56 mA RX 5 GH • SPI or QSPI host interface, 3-wire or 4-wire coexistence interface

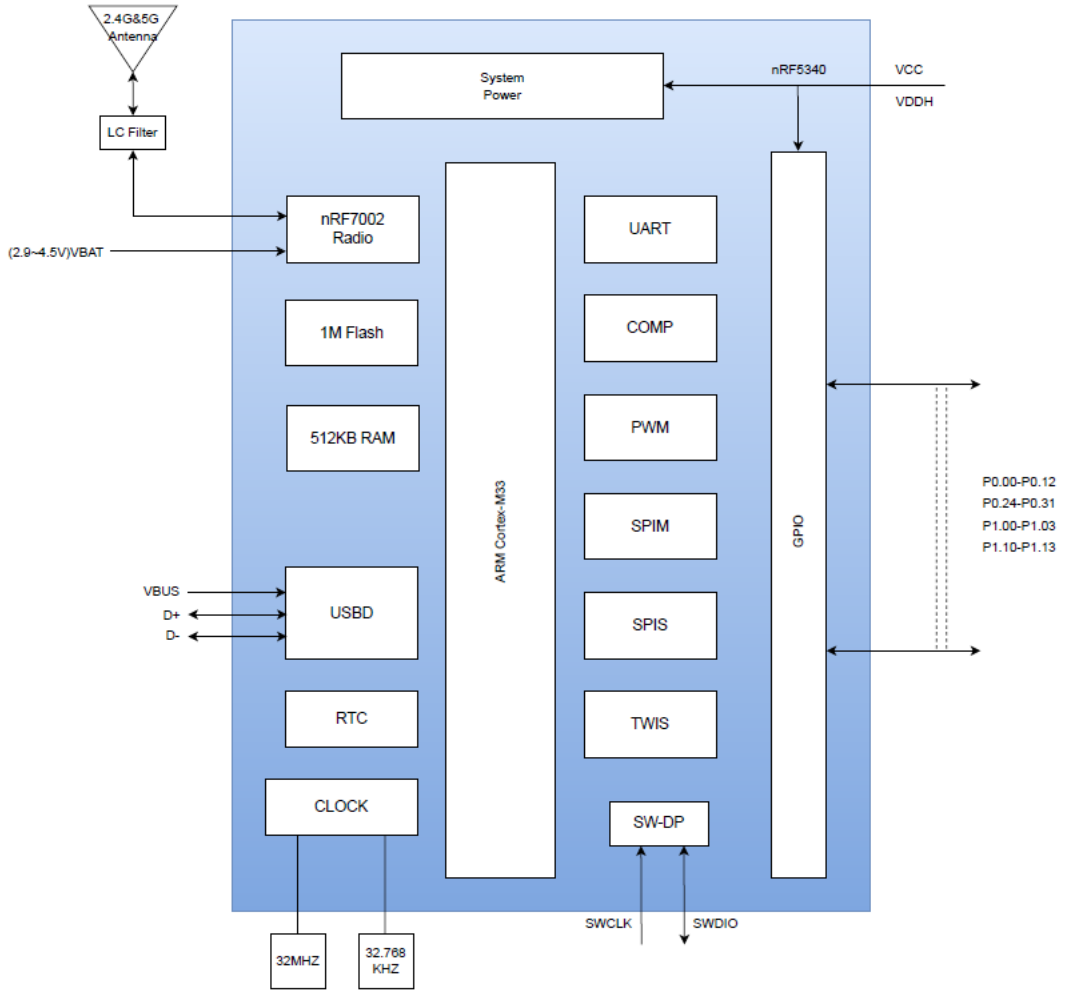
BLE Specification	**Application core:** • 128 MHz or 64 MHz operation • 1 MB flash and 512 kB RAM • Serial wire debug (SWD) • ARM® TrustZone® Cryptocell-312 co-processor **Network core:** • 256 kB flash and 64 kB low leakage RAM • Receiver Sensitivity: -98 dBm at 1Mbps. • BLE 5.3 data rate: 2Mbps, 1Mbps, 500kbps, 125kbps • Serial Wire Debug (SWD) • Over-the-Air (OTA) firmware update • USB 2.0 full speed (12 Mbps) controller • Audio peripherals: I2S, digital microphone interface (PDM)

4. Applications

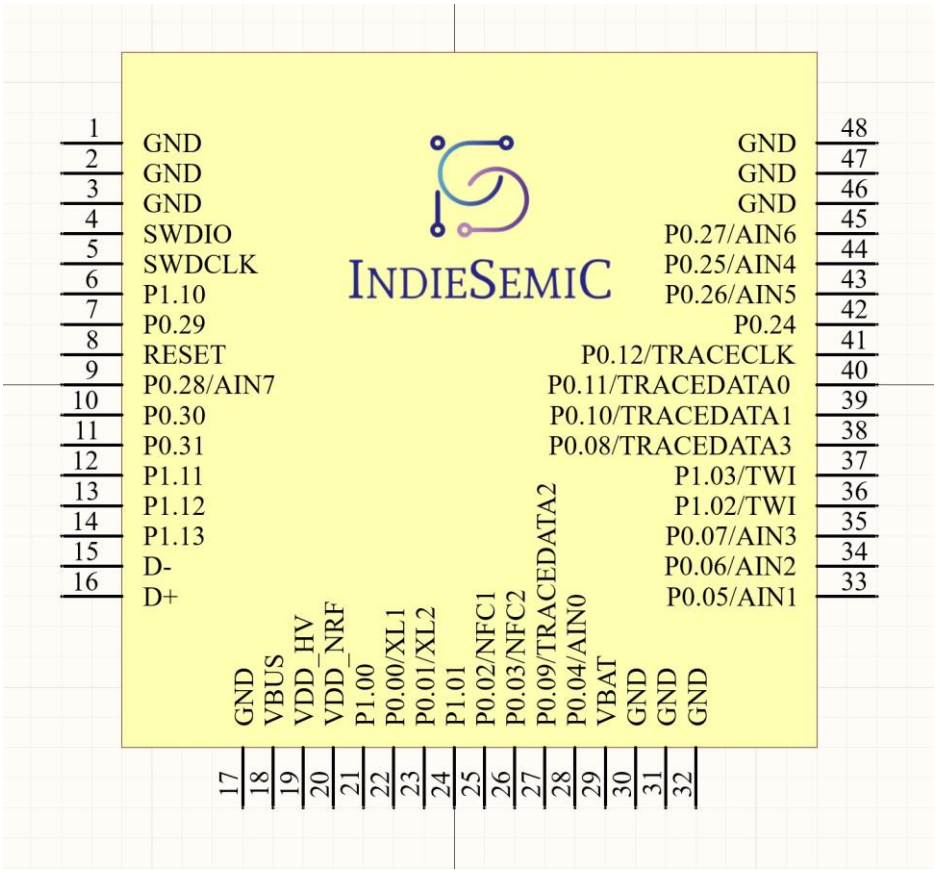
Due to varied support of protocols and stacks, the BLE+ Wi-fi module nRF5340 cansupport varied applications. A brief of the applications is as below:

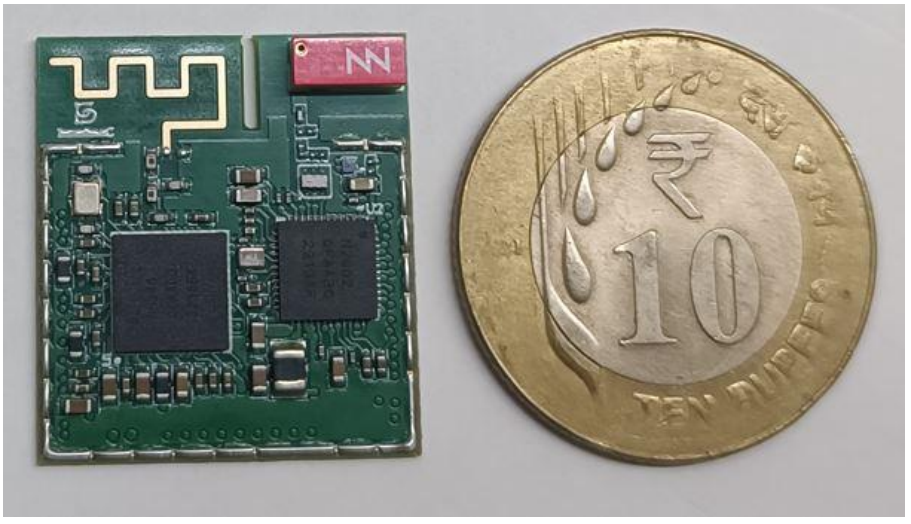
Internet of Things	• Smart home & Industrial sensors and controllers • Smart Home applications, including Gateways and Border Routers
Advanced wearable	• Connected watches • Advanced personal fitness devices • Wearable's with wireless payment
Interactive entertainment devices	• Advanced remote controls • Gaming controller
Advanced computer peripherals and I/O devices	• Health/Fitness sensor and monitor device • Medical device

5. Application Block Diagram

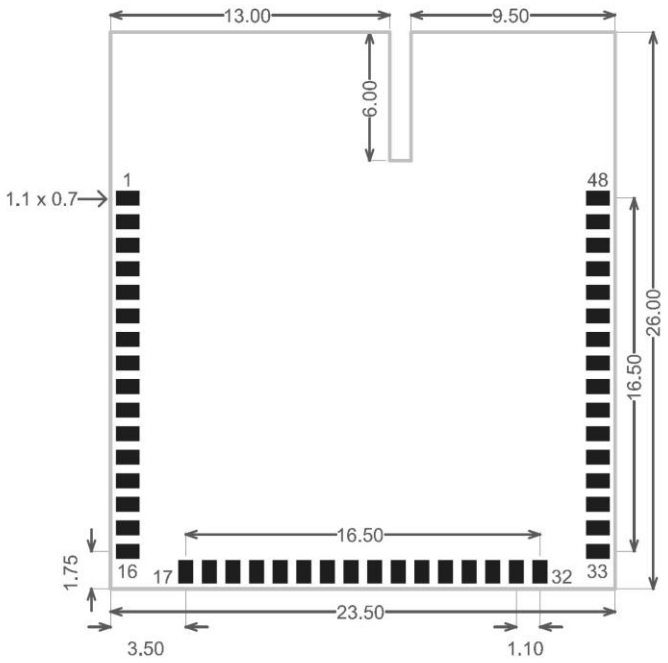


6. Module Pin-out





7. PCB Footprint



Note: Pad size suggest 2.54*0.65mm, Pad interval 1mm.

Email us – sales@indiesemic.com or nikul.shah@indiesemic.com for Altium or KiCad files

8. Pin Description

Pin No.	Name	I/O Type	Description
1	GND	Power	Ground
2	GND	Power	Ground
3	GND	Power	Ground
4	SWDIO	Debug	Debug serial data
5	SWDCLK	Debug	Serial wire debug clock input for debug and programming
6	P1.10	Digital I/O	General-Purpose I/O
7	P0.29	Digital I/O	General-Purpose I/O
8	RESET	RESET	Configurable as system RESET
9	P0.28	Digital I/O	General-Purpose I/O
10	P0.30	Digital I/O	General-Purpose I/O
11	P0.31	Digital I/O	General-Purpose I/O
12	P1.11	Digital I/O	General-Purpose I/O
13	P1.12	Digital I/O	General-Purpose I/O
14	P1.13	Digital I/O	General-Purpose I/O
15	D_N	Digital I/O	USB D-
16	D_P	Digital I/O	USB D+
17	GND	Power	Ground
18	VBUS	Power Source	USB interface acquired power input after conversion
19	VDDH	Power	VDDH(Supply electricity:2.5V~5.4V)
20	VDD	Power	VDD(Supply electricity:1.7V~3.6V)
21	P1.00	Digital I/O	General-Purpose I/O
22	P0.00	Digital I/O	General-Purpose I/O
23	P0.01	Digital I/O	General-Purpose I/O

24	P1.01	Digital I/O	General-Purpose I/O
25	P0.02	Digital I/O	General-Purpose I/O
26	P0.03	Digital I/O	General-Purpose I/O
27	P0.09	Digital I/O	General-Purpose I/O
28	P0.04	Digital I/O	General-Purpose I/O
29	VBAT70	Power	Power
30	GND	Power	GND
31	GND	Power	GND
32	GND	Power	GND
33	P0.05	Digital I/O	General-Purpose I/O
34	P0.06	Digital I/O	General-Purpose I/O
35	P0.07	Digital I/O	General-Purpose I/O
36	P1.02	Digital I/O	General-Purpose I/O
37	P1.03	Digital I/O	General-Purpose I/O
38	P0.05	Digital I/O	General-Purpose I/O
39	P0.10	Digital I/O	General-Purpose I/O
40	P0.11	Digital I/O	General-Purpose I/O
41	P0.12	Digital I/O	General-Purpose I/O
42	P0.24	Digital I/O	General-Purpose I/O
43	P0.26	Digital I/O	General-Purpose I/O
44	P0.25	Digital I/O	General-Purpose I/O
45	P0.27	Digital I/O	General-Purpose I/O
46	GND	Power	GND
47	GND	Power	GND
48	GND	Power	GND

9. Interfaces

9.1 Power Supply

- BLE Chip working voltage range is 2.7V to 3.6V, to ensure normal use, supply voltage range should be 3.0V to 3.6V as far as possible.
- Wi-Fi Chip working voltage range is 2.9V to 4.5V, to ensure normal use, supply voltage range should be 3.3V to 4.5V as far as possible.

9.2 System Function Interfaces

9.2.1 GPIOs

The general purpose I/O is organized as one port with up to 29 I/Os enabling access and control of up to 29 pins through one port. Each GPIO can be accessed individually with the following user configurable features:

- Input/output direction
- Output drive strength
- Wake-up from high- or low-level triggers on all pins
- Trigger interrupt on all pins
- All pins can be configured as PWM

9.2.2 Reset

The reset pin of the module is in the internal pull-high state. When the reset pin of the module is input to a low level, the module will be automatically reset. After the reset pin is used, the parameters of the current setting will not be ANT.

9.2.3. Flash Program I/Os

The module has two programmer pins, respectively SWDCLK pin and SWDIO pin. The two pin Serial Wire Debug (SWD) interface provided as a part of the Debug Access Port (DAP) offers a flexible and powerful mechanism for non- intrusive debugging of program code. Breakpoints and single stepping are partof this support.

10. Electrical Characteristics

10.1 Absolute Maximum Ratings

Parameter	Condition	Min.	Typical	Max.	Unit
Storage Temperature		-40		125	℃
ESD Protection	VESD			2000	V
Supply Voltage	VCC, VBus	-0.3		3.9	V
Voltage on Any I/O Pin		-0.3		3.63	V

10.2 Recommended Operating Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Temperature	TA	-40	25	85	℃
Power Supply	VCC	1.7	3.3	3.6	V
Input Low Voltage	VIL	0		0.3xVC	V
Input High Voltage	VIH	0.7xVC		VCC	V

10.3 Current Ratings

System State	TX Peak @ 4dBm	RX Peak	Sleep Mode (Average)	Idle Mode (Average)
Current (peak) @ 3V	7.5mA	5.4 mA	4 uA	4 uA