

NINA-W10 series



Stand-alone multiradio modules

The smallest industrial Wi-Fi and Bluetooth modules

- Wi-Fi 802.11b/g/n and dual-mode Bluetooth v4.2
- Powerful open CPU for advanced customer applications
- Small footprint and multiple antenna options
- Pin compatible with other NINA modules
- Global certification



Product description

The NINA-W10 series are stand-alone multiradio MCU modules that integrate a powerful microcontroller (MCU) and a radio for wireless communication. With the open CPU architecture, customers can develop advanced applications running on the dual core 32-bit MCU. The radio provides support for Wi-Fi 802.11b/g/n in the 2.4 GHz ISM band, Bluetooth BR/EDR, and Bluetooth low energy communications.

NINA-W10 includes the wireless MCU, flash memory, crystal, and components for matching, filtering, antenna and decoupling, making it a very compact stand-alone multiradio module. The module can be used to design solutions with top grade security, thanks to integrated cryptographic hardware accelerators. This enables secure boot, which ensures the module boots up only in the presence of authenticated software. The small size and the embedded security capabilities make NINA-W10 ideal for critical IoT applications where security is important. Intended applications include telematics, low power sensors, connected factories, connected buildings (appliances and surveillance), point-of-sales, and health devices.

Device design is simplified, as developers can choose to use an external antenna (NINA-W101) or take advantage of the internal antenna (NINA-W102 and NINA-W106). Additionally, the NINA-W10 modules are pin-compatible with other NINA modules, thus offering maximum flexibility for development of similar devices offering different radio technologies.

The NINA-W10 series is globally certified and this reduces time to market for the end product. To ensure operation in harsh professional environments, the modules are industrial grade and qualified according to ISO 16750, supporting an extended temperature range of -40 °C to +85 °C.

	NINA-W101	NINA-W102	NINA-W106
Grade			
Automotive			
Professional	•	•	•
Standard			
Radio			
Chip inside	ESP32	ESP32	ESP32
Bluetooth qualification	v4.2	v4.2	v4.2
Bluetooth low energy	•	•	•
Bluetooth BR/EDR	•	•	•
Bluetooth output power EIRP [dBm]	8	8	8
Antenna type (see footnotes)	pin	metal	pcb
Wi-Fi 2.4 / 5 [GHz]	2.4	2.4	2.4
Wi-Fi IEEE 802.11 standards	b/g/n	b/g/n	b/g/n
Wi-Fi output power EIRP [dBm]	18	18	18
Max Wi-Fi range [meters]	500	400	500
Application software			
Open CPU for embedded applications	•	•	•
Interfaces			
UART	◆	◆	◆
SPI	◆	◆	◆
I2C	◆	◆	◆
I2S	◆	◆	◆
RMII	◆	◆	◆
GPIO pins	24	24	26
AD converters [number of bits]	12	12	12
Features			
Point-to-Point Protocol	◆	◆	◆
Low Energy Serial Port Service	◆	◆	◆
MCU (see footnotes)	LX6	LX6	LX6
RAM [kB]	520	520	520
Flash [kB]	2048	2048	4096
Wi-Fi throughput [Mbit/s] *	25	25	25 §
Maximum Bluetooth connections	8	8	8
Micro Access Point [max stations]	10	10	10
Wi-Fi enterprise security	◆	◆	◆
End-to-end security (TLS)	◆	◆	◆
Secure boot	◆	◆	◆
WPA/WPA2/WPA3	◆	◆	◆

pin = Antenna pin
 metal = Internal metal PIFA antenna
 pcb = Internal PCB antenna
 * = User data throughput over RMII

LX6 = 240 MHz dual-core Xtensa LX6
 ◆ = Feature enabled by HW. Support depends on the open CPU app SW.
 § = Limited to 8 Mbit/s in Wi-Fi receive

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Features

Wi-Fi standards	802.11b/g/n
Wi-Fi channels	2.4 GHz channels 1-13
Wi-Fi maximum transfer rates	802.11b: 11 Mbit/s 802.11g: 54 Mbit/s 802.11n: 72 Mbit/s (20 MHz channel bandwidth) 150 Mbit/s (40 MHz channel bandwidth)
Output power	Wi-Fi: 18 dBm EIRP Bluetooth BR/EDR: 8 dBm EIRP Bluetooth low energy: 8 dBm EIRP
Sensitivity (conducted)	Wi-Fi: -96 dBm Bluetooth BR/EDR: -88 dBm Bluetooth low energy: -88 dBm
Bluetooth	v4.2 (Bluetooth BR/EDR and Bluetooth Low Energy)
Antenna	Internal antenna or antenna pin for connecting to the external antenna

Electrical data

Power supply	3.0 V to 3.6 V
Power consumption	Wi-Fi 16 dBm: 190 mA Bluetooth BR/EDR 0 dBm: 130 mA Bluetooth low energy 0 dBm: 130 mA Light-sleep mode: 0.8 mA Hibernate mode: 5 µA

Interfaces

All variants	UART, RMII, I2S, I2C, SPI, ADC, DAC, GPIO, SDIO host, CAN
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Package

Dimensions	NINA-W101: 10.0 x 10.6 x 2.2 mm NINA-W102: 10.0 x 14.0 x 3.8 mm NINA-W106: 10.0 x 14.0 x 2.2 mm
Weight	< 1 g
Mounting	Machine mountable Solder pins

Environmental data, quality & reliability

Operating temperature	-40 °C to +85 °C
Storage temperature	-40 °C to +85 °C
Humidity	RH 5-90% non-condensing

Certifications and approvals

Type approvals	Europe (ETSI RED), US (FCC/CFR 47 part 15 unlicensed modular transmitter approval)
Type approvals (pending for NINA-W106 variant)	Canada (IC RSS), Japan (MIC), Taiwan (NCC), South Korea (KCC), Australia (ACMA), New Zealand, Brazil (Anatel), South Africa (ICASA)
Health and safety	EN 62479, EN 62368-1, IEC 62368-1
Medical Electrical Equipment	IEC 60601-1-2
Bluetooth qualification	v4.2

Support products

EVK-NINA-W101	Evaluation kit for NINA-W101 module with antenna pin
EVK-NINA-W102	Evaluation kit for NINA-W102 module with internal PIFA antenna
EVK-NINA-W106	Evaluation kit for NINA-W106 module with internal PCB antenna

Product variants

NINA-W101	Multiradio wireless MCU module with antenna pin
NINA-W102	Multiradio wireless MCU module with internal PIFA antenna
NINA-W106	Multiradio wireless MCU module with internal PCB antenna

Further information

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

For more product details and ordering information, see the [product data sheet](#).

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