Product summary

NINA-W15 series

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Stand-alone multiradio modules

Standard

Professional

Automotive

Secure industrial multiradio made easy

- Simultaneous Wi-Fi 802.11b/g/n and Bluetooth dual-mode
- u-connect software for accelerated time to market
- Built-in security with secure boot
- Small footprint and multiple antenna options
- Global certification

10.0 × 10.6 × 2.2 mm

10.0 × 14.0 × 3.8 mm

10.0 × 14.0 × 2.2 mm

Product description

NINA-W15 series stand-alone multiradio modules integrate Wi-Fi, Bluetooth BR/EDR and Bluetooth Low Energy in a compact form factor. The modules support simultaneous operation on Wi-Fi and Bluetooth dual-mode and can serve as a gateway between Bluetooth and Wi-Fi or Ethernet.

Using either a UART, SPI or a high speed RMII interface, the modules connect to a host system. They can be both a Wi-Fi station and micro access point, Bluetooth master, slave, peripheral and central, DHCP server and client.

The modules are suitable for a wide range of applications, including, telematics, industrial automation, connected buildings, point-of-sales, and the wireless connection of sensors and medical devices. They include a secure boot function to ensure that only authenticated software is run on the module, and support several other embedded security features.

The u-connectXpress software, flashed to the modules prior to delivery, simplifies the host system integration to reduce your product time to market. The software provides end-to-end security with TLS and built-in MQTT protocol for lightweight communication with cloud-based applications and services. It also supports a range of features that are configured from the host using AT commands.

NINA-W15 modules can act as an MQTT-SN gateway allowing devices without a TCP/IP stack to make use of the MQTT protocol. This makes it possible for networks comprising Bluetooth Low Energy sensors to easily communicate with the cloud for example.

To simplify device design, developers can choose to use an external antenna (NINA-W151) or either of the available internal antennas (NINA-W152 and NINA-W156). NINA-W15 modules are pin-compatible with other NINA modules and offer maximum flexibility for the development of similar devices with different radio technologies. The modules support operation in an extended temperature range of –40° C to +85° C and are certified for global use.

	NINA-W151	NINA-W152	NINA-W156
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	400
Application software			
u-connectXpress	•	•	•
Interfaces			
UART	1	1	1
SPI	1	1	1
RMII	1	1	1
GPIO pins	16	16	18
Features			
AT command interface	•	•	•
Point-to-Point Protocol	•	•	•
Low Energy Serial Port Service	•	•	•
MCU (see footnotes)	LX6	LX6	LX6
RAM [kB]	520	520	520
Flash [kB]	2048	2048	2048
Wi-Fi throughput [Mbit/s] *	13	13	13 **
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 trace antenna

LX6 = 240 MHz dual-core Xtensa LX6
* = User data throughput over RMII
** = Limited to 8 Mbit/s in Wi-Fi receive

NINA-W15 series

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Features

Wi-Fi standards	802.11b/g/n 802.11d/e/i/h/w
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
Wi-Fi output power	18 dBm EIRP
Wi-Fi Sensitivity	–96 dBm conducted
Bluetooth output power	8 dBm EIRP (Bluetooth BR/EDR) 8 dBm EIRP (Bluetooth Low Energy)
Bluetooth sensitivity	-88 dBm conducted (Bluetooth BR/EDR 1 Mbit/s) -88 dBm conducted (Bluetooth Low Energy)
Antenna	Internal antenna or antenna pin for connecting to the external antenna

u-connectXpress software

This section describes the NINA-W15 features integrated in the u-connectXpress software. All NINA-W15 modules are delivered with this software and the module is configured using AT commands.

Wi-Fi features	Wi-Fi station Wi-Fi micro access point
Bluetooth features	SPP profile u-blox Low Energy Serial Port Service (SPS) GATT server and client Simultaneous central and peripheral roles Up to 6 peripheral connections
Security features	WPA/WPA2/WPA3 Enterprise security (EAP-TLS, PEAP) End-to-end security with TLS Protected Management Frames (PMF) Secure boot Secure simple pairing Bluetooth LE secure connections
IoT features	TCP/UDP client/server TLS client HTTP/HTTPS client SNTP client MQTT-SN/MQTT client gateway DHCP client/server Digital sensor/actuator interface
IoT cloud support	Thingstream AWS IoT Core Microsoft Azure IoT Hub IBM IoT Platform
Extended Data Mode™	For individually controlled multipoint data channels
Point-to-Point Protocol	For UART-based IP connectivity between host and module, enables individually controlled data channels and AT commands in parallel
Configuration over air	Wireless transmission of AT commands to control the module
Throughput (user data)	Bluetooth low energy: 350 kbit/s Bluetooth BR/EDR: 1 Mbit/s Wi-Fi: 13 Mbit/s
Support tools	s-center

Interfaces

All variants	UART, SPI, RMII, GPIO

Package

Dimensions	NINA-W151: 10.0 x 10.6 x 2.2 mm NINA-W152: 10.0 x 14.0 x 3.8 mm NINA-W156: 10.0 x 14.0 x 2.2 mm
Weight	< 1 g
Mounting	Machine mountable Solder pins

Environmental data, quality and reliability

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

Electrical data

Power supply	3.3 V
Power consumption	Wi-Fi 15 dBm: 130 mA Blutooth BR/EDR: 150 mA Bluetooth Low Energy: 60 mA Standby mode: 30 mA Sleep mode Wi-Fi: 1.5 mA Stop mode: 5 µA

Certifications and approvals [1]

Type approvals	Europe (ETSI RED), US (FCC/CFR 47 part 15 unlicensed modular transmitter approval), Canada (IC RSS), Japan (MIC), Taiwan (NCC), South Korea (KCC), Brazil (Anatel), Australia (ACMA), New Zealand; South Africa (ICASA)
Health and safety	EN 62368-1, EN 62479, EN 62311
Medical Electrical Equipment	IEC 60601-1-2
Bluetooth qualification	v4.2 (Bluetooth BR/EDR and Bluetooth Low Energy)
Cloud service programs	AWS IoT Core Qualified

1 = NINA-W156 variant pending approvals

Support products

EVK-NINA-W151	Evaluation kit for NINA-W151 module with antenna pin and external antenna
EVK-NINA-W152	Evaluation kit for NINA-W152 module with internal PIFA antenna
EVK-NINA-W156	Evaluation kit for NINA-W156 module with internal PCB trace antenna

Product variants

NINA-W151	With u-connectXpress software and antenna pin
NINA-W152	With u-connectXpress software and internal PIFA antenna
NINA-W156	With u-connectXpress software and internal PCB trace 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.