Product summary

NORA-W40 series

S

Stand-alone Wi-Fi 6 multiradio modules

Standard

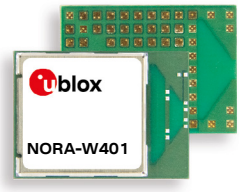
Professional

Automotive

Wireless MCU modules for cost-efficient designs

- Single-band Wi-Fi 6, Bluetooth Low Energy 5.3, Zigbee, and Thread
- Supports Wi-Fi 6 Target Wake Time and other low power peripherals
- Full set of enhanced security features
- Small footprint, multiple antenna options, pin compatible with other NORA modules
- Matter over Wi-Fi or Thread
- Global certification

10.4 x 14.3 x 1.9 mm



Product description

NORA-W40 series are small, stand-alone, single-band Wi-Fi 6 and Bluetooth Low Energy wireless microcontroller unit (MCU) modules based on Espressif's ESP32-C6 System-on-Chip. The modules are ideal for users looking to add advanced wireless connectivity to their end products.

The NORA-W40 Wi-Fi 6 features improve network efficiency, latency, range, and power consumption compared to earlier Wi-Fi generations. Bluetooth Low Energy 5.3, Zigbee, and the Thread mesh networking protocol make NORA-W40 suited to many different use cases. The Matter application protocol is supported over Thread and Wi-Fi, allowing interoperability in a growing ecosystem of various smart home products.

The open CPU configuration embeds a RISC-V MCU, clocked up to 160 MHz, with 512 kB SRAM and 4/8 MB flash. With many peripheral interfaces, NORA-W40 can operate completely stand-alone, hosting advanced software applications for a variety of use cases. NORA-W40 comes with a separate low-power (LP) RISC-V co-processor, LP I2C, and LP UART making it a perfect fit for low-power sensor applications.

The NORA-W40 series includes hardware security features like secure boot with a hardware root of trust, a trusted execution environment controller, cryptographic hardware accelerators, encrypted flash, and protection of the debug port. The wireless communication can be secured with WPA2/WPA3 authentication, Wi-Fi enterprise security, TLS encryption, HTTPS, and Bluetooth LE secure connection pairing.

NORA-W406's internal PCB antenna provides a robust low-profile solution with high performance and an extensive range, while NORA-W401 has a module pin to connect to an external antenna of choice. The modules are globally certified for use with the internal antenna or a range of external antennas. This reduces time, cost and effort for customers integrating Wi-Fi, Bluetooth Low Energy, and Thread in their products.

The modules are ideally suited to wide range of applications, including low-power wireless sensors, industrial automation, smart buildings and homes, smart city, healthcare and medical devices, telematics, and point-of-sales.

	NORA-W401	NORA-W406
Grade		
Automotive		
Professional	•	•
Standard		
Radio		
Chip inside	ESP32-C6	ESP32-C6
Bluetooth qualification	v5.3	v5.3
Bluetooth Low Energy	•	•
Bluetooth output power EIRP [dBm]	10	10
Wi-Fi bands [GHz]	2.4	2.4
Wi-Fi IEEE 802.11 standards	b/g/n/ax	b/g/n/ax
Wi-Fi output power EIRP [dBm]	20	20
Thread	•	•
Antenna type (see footnotes)	pin	pcb
Application software		
Open CPU for embedded applications	•	•
Interfaces		
UART	♦	♦
SPI	♦	♦
SDIO 2.0	♦	♦
TWAI® (CAN 2.0 compatible)	♦	♦
I2C	♦	♦
I2S	♦	♦
GPIO pins (user available)	22	22
AD converters [number of bits]	12	12
Low-power I2C	♦	♦
Low-power UART	♦	♦
Features		
MCU	RISC-V, 160 MHz	
RAM [kB]	512	512
Flash [MB]	4/8	4/8
FOTA	♦	♦
Trusted execution environment	♦	♦
Secure boot	♦	♦
WPA2/WPA3	♦	♦

pin = Antenna pin
pcb = Internal PCB antenna

♦ = Feature enabled by HW. Support depends on the open CPU app SW.

NORA-W40 series

S

Features

Wi-Fi standards	IEEE 802.11 b/g/n/ax
Wi-Fi channels	2.4 GHz channels 1-14 (depending on region)
Wi-Fi maximum transfer rates	IEEE 802.11b: 11 Mbit/s IEEE 802.11g: 54 Mbit/s IEEE 802.11n: 72 Mbit/s IEEE 802.11ax: 115 Mbit/s
Bluetooth	v5.3 Bluetooth Low Energy
Bluetooth PHY rate	125 kbps, 500 kbps, 1 Mbps, 2 Mbps
Output power (conducted)	Wi-Fi 2.4 GHz: 17 dBm Bluetooth: 7 dBm
Sensitivity	Wi-Fi 2.4 GHz: -97 dBm Bluetooth: -98 dBm
Antenna	Internal PCB antenna or antenna pin for connecting to an external antenna

Electrical data

Power supply	3.3 V (+/-10%)
Power consumption	Wi-Fi TX 802.11ax MCS9 @ 16.5 dBm: 252 mA (100% duty cycle) Bluetooth LE TX @ 0 dBm: 130 mA (100% duty cycle) Wi-Fi RX: 78 mA Light sleep mode: 180 µA Deep Sleep mode: 7 µA

Open CPU for customer applications

Customers develop and embed their own applications on the NORA-W40 modules using the ESP-IDF (open CPU concept). This section describes the hardware features that can be enabled by the NORA-W40 modules.

MCU system	160 MHz RISC-V application processor, 20MHz RISC-V LP co-processor, 512 kB SRAM, 4/8MB Flash
Hardware interfaces	UART SPI SDIO TWAI® (CAN 2.0 compatible) I2C I2S JTAG over USB GPIO ADC Low-power I2C Low-power UART
Security	Trusted execution environment Hardware cryptographic accelerator Secure bootloader External memory encryption Flash encryption Random number generator (RNG) OTP, 4 kB Secure debug interface
Development environment	ESP-IDF SDK

Package

Dimensions	10.4 x 14.3 x 1.9 mm
Mounting	Machine mountable solder pins

Environmental data, quality & reliability

Operating temperature	–40 °C to 85 °C
Storage temperature	–55 °C to +125 °C
Humidity	RH 5-90% non-condensing
RoHS directive	RoHS 2 and RoHS 3

Certifications and approvals [1]

Type approvals	Europe (RED), Great Britain (UKCA), US (FCC), Canada (ISED), Japan (MIC), Taiwan (NCC), South Korea (KCC), Australia (ACMA), New Zealand
Health and safety	EN 62479, EN 62368-1, IEC 62311
Medical Electrical Equipment	IEC 60601-1-2
Bluetooth qualification	Bluetooth Low Energy 5.3, qualification pending

1 = Certifications are pending

Support products

EVK-NORA-W401	Evaluation kit for NORA-W401 module with antenna pin
EVK-NORA-W406	Evaluation kit for NORA-W406 module with internal PCB antenna

Product variants

NORA-W401	Multiradio wireless MCU module with antenna pin
NORA-W406	Multiradio wireless MCU module with internal PCB antenna

Further information

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

For more product details and ordering information, see the product data sheet.