Product summary

SARA-R4 (x2B) series

Multi-band LTE-M / NB-IoT and EGPRS modules

Standard

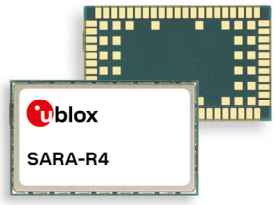
Professional

Automotive

Ultra-compact LTE Cat M1 / NB1 and EGPRS modules with multi-regional coverage

- Configurable with a single hardware version
- Flexible mode selection as LTE Cat M1 / LTE Cat NB1 / EGPRS – only/preferred
- Deliver critical firmware updates via uFOTA with LWM2M
- Low power consumption and longer battery life
- Extended range in buildings, basements, and with NB1, underground
- Easy migration between u-blox 2G, 3G and 4G modules

16.0 × 26.0 × 2.5 mm



Product description

At 16 x 26 mm, the SARA-R4 (x2B) series modules provide an ultra-compact LTE-M/NB-IoT and EGPRS multi-mode product in a single hardware design. They have software-based LTE band configuration, and come in an LGA package for easy manufacturing.

The SARA-R410M and SARA-R412M variants simplify diverse deployments worldwide and provide enormous operational efficiencies. Software-based configurability of operator profiles and LTE bands enables a wide range of multi-regional coverage. The flexibility extends further through system selection as LTE-M, NB-IoT, EGPRS single or preferred modes. Customers can future-proof their solutions by means of OTA firmware updates, thanks to the uFOTA client/server solution, which utilizes LWM2M, a light and compact protocol ideal for IoT applications. The modules offer low power consumption by utilizing PSM and eDRX, which extend battery life to up to 10 years. Coverage enhancement reaches deeper into buildings and basements (and underground with NB1) with up to 15 dB improved MCL compared to GSM or LTE Cat 1.

With many interface options and an integrated IP stack, the SARA-R4 modules are targeted to a wide range of data-centric IoT applications, such as smart metering, smart lighting, telematics, asset tracking, remote monitoring, alarm panels, and connected health. The SARA-R4 modules target long life, low-maintenance, cost-sensitive, lower power consumption, extended battery life applications.

The SARA form factor follows the u-blox nested design principle and is compatible with other u-blox product families, which facilitates easy migration from 2G, 3G and 4G. This also maximizes the investments of customers, simplifies logistics, and enables very short time-to-market.

The temperature range of –40 to +85 °C guarantees operation in harsh environments. The module is manufactured in ISO/TS 16949 certified sites with the highest production standards, quality and reliability. Each module is fully tested and inspected during production.

	SARA-R410M-52B	SARA-R410M-02B	SARA-R412M-02B
Grade			
Automotive			
Professional	•	•	•
Standard			
Regions			
	North America	Multi-region	Multi-region
Access Technology			
GSM/GPRS bands			Q
LTE bands	2, 4, 5, 12, 13	*	*
Data rate	M1	M1/NB	M1/NB
Positioning			
GNSS via modem	•	•	•
AssistNow Software	•	•	•
Interfaces			
UART	1	1	1
USB	1	1	1
DDC (I^2C)	1	1	1
(U)SIM	1	1	1
GPIO	6	6	6
Features			
Last gasp	•	•	•
Antenna detection	•	•	•
Embedded TCP/UDP stack	•	•	•
Embedded HTTPS, FTPS, TLS	•	•	•
Power Save Mode Rel.12	•	•	•
eDRX	•	•	•
Deep sleep mode	•	•	•
FW update via serial	•	•	•
uFOTA	•	•	•
Dual stack IPv4/IPv6	•	•	•
MQTT	•	•	•
LWM2M Device Management	•	•	•

Q = Quad-band
NB = Cat NB1 (27.2 kb/s DL, 62.5 kb/s UL)
M1 = LTE Cat M1 (300 kb/s DL, 375 kb/s UL)

* = Bands may include:
1, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20, 25, 26, 28

SARA-R4 (x2B) series

C

Features

LTE	3GPP Release 13 LTE Cat M1 3GPP Release 13 LTE Cat NB1 Coverage Enhancement Mode A Rel 12 LTE Power Save Mode, PSM Rel 13 e-DRX Cat M1 Half-duplex (300 kbit/s DL, 375 kbit/s UL) Cat NB1 Half-duplex (27.2 kbit/s DL, 62.5 kbit/s UL) Cat NB1 Non-IP Data Delivery
GSM	EGPRS Power Class E2
SMS	MT/MO PDU / Text mode SMS over SG/NAS

Software features

Protocols	Dual stack IPv4 and IPv6 Embedded TCP/IP, UDP/IP, FTP, HTTP Embedded MQTT Embedded HTTPS, FTPS, TLS
Device Management	OMA LWM2M
GNSS Interfaces	Direct access to u-blox GNSS via module AssistNow software for fastest GPS Time-To-First-Fix
Firmware upgrade	Via USB uFOTA client/server solution (Firmware upgrade Over the Air)

Electrical data

Power supply	3.8 V nominal, range 3.2 V to 4.2 V (SARA-R412M has range 3.2 V to 4.5 V)	
Power consumption	Power Save Mode: Active Idle Mode:	8 µA 2 mA
LTE Cat NB1 Connected Mode power consumption	Min power 0 dBm 12 dBm 18 dBm Max power	60 mA 65 mA 80 mA 100 mA 140 mA
LTE Cat M1 Connected Mode power consumption	Min power 0 dBm 12 dBm 18 dBm Max power	100 mA 105 mA 125 mA 150 mA 190 mA
2G Connected Mode power consumption	Max power	200 mA

Package

96 pin LGA: 16.0 x 26.0 x 2.5 mm, < 3 g

Environmental data, quality & reliability

Operating temperature	–40 °C to +85 °C
RoHS compliant (lead-free)	
Qualification according to ISO 16750	
Manufactured in ISO/TS 16949 certified production sites	

Certifications and approvals

SARA-R410M-52B	FCC, ISED, PTCRB, AT&T, GCF, Verizon
SARA-R410M-02B	FCC, ISED, NCC, RCM, RED, PTCRB, AT&T, Sprint, Telstra, Telus, Verizon, USCC, GITEKI
SARA-R412M-02B	FCC, ISED, RED, PTCRB, AT&T, T-Mobile USA

Interfaces

Serial	1 UART 1 USB 2.0 (high-speed, 480 Mbit/s) 1 DDC (I²C)
GPIO	Up to 6 GPIOs, configurable
(U)SIM	Supports 1.8 V and 3.0 V, SIM toolkit

Support products

EVK-R410M-02B	Evaluation kit for SARA-R410M-02B
EVK-R412M-02B	Evaluation kit for SARA-R412M-02B

Product variants

SARA-R410M-52B	LTE module for North America; Cat M1 bands: 2, 4, 5, 12, 13
SARA-R410M-02B	LTE module for multi-regional use; Cat M1/NB1 bands: 1*, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20, 25, 26*, 28
SARA-R412M-02B	LTE, 2G module for multi-regional use; Cat M1/NB1 bands: 2, 3, 4, 5, 8, 12, 13, 20, 26*, 28* EGPRS quad-band, 850/900/1800/1900 MHz

* = Roaming bands

Further information

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

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

Legal Notice:

u-blox reserves all rights to this document and the information contained herein. Products, names, logos and designs described herein may in whole or in part be subject to intellectual property rights. Reproduction, use, modification or disclosure to third parties of this document or any part thereof without the express permission of u-blox is strictly prohibited.

The information contained herein is provided "as is". No warranty of any kind, either express or implied, is made in relation to the accuracy, reliability, fitness for a particular purpose or content of this document. This document may be revised by u-blox at any time. For most recent documents, please visit www.u-blox.com.

Copyright © 2019, u-blox AG