

Monarch NB02S Module



NB-IoT Module Enabling Next-generation 5G Massive IoT

The Monarch NB02S module is an LTE Cat NB1/NB2 module based on Sequans' second generation Monarch N chip platform. The Monarch NB02S module leverages Sequans' 15-plus years of experience in 4G and 5G technologies and incorporates Sequans' carrier-proven LTE protocol stack and a software suite that is one of the most mature in the industry. The Monarch NB02S module is the first member of Sequans next generation "S" family of modules, featuring a very small yet cost-effective form factor that requires no external components.

The Monarch NB02S module inherits Monarch's already certified NB-IoT stack and delivers the significantly improved performance and lower power consumption enabled by Sequans' second generation Monarch N chip and the new module architecture. The Monarch NB02S module is a total module solution, including a complete, Single-SKU™ RF front end for deployment in any band worldwide, and an integrated EAL5+ Secure Enclave (SE) enabling the integration of the SIM inside the module with zero compromise on security while lowering cost and reducing complexity. Sequans technology, both hardware and software, is 100-percent owned by Sequans, ensuring fast time to market and lowest total cost of ownership for device makers.



Highlights

- Supports 3GPP LTE Release 14/15 Cat NB1 and NB2 with up to 120.7 kbps DL and 21 kbps UL
- Tiny "S" series LGA module
- Single-rail power supply supporting 2.5-5.5 V allows for direct connection to low-cost batteries
- Programmable RF filtering for global band support in a Single-SKU™ design (617 MHz to 2.2 GHz)
- Supports LTE bands 1, 2, 3, 4, 5, 8, 12, 13, 14, 17, 18, 19, 20, 25, 26, 28, 66, 70, 71, 85
- Adaptive output power supporting +20dBm and +14dBm for efficient, deep indoor penetration
- Module-as-a-SIM™ -- Integrated connectivity in the module with no SIM card or SIM chip required inside or outside the module
- Embedded LWM2M client, TCP/IP stack and Sequans Cloud Connectors
- Fully tested and calibrated for easy integration into product hardware
- Application MCU available for customer applications
- Fully software-compatible with first generation Monarch NB01Q module, enabling easy migration

Monarch N LTE Platform

At the heart of the Monarch NB02S module is Monarch N, Sequans' second generation LTE Cat NB1/NB2 platform. The new generation Monarch technology improves on the size, cost, and power consumption of first-generation Monarch and includes new, powerful features such as an EAL5+ Secure Enclave, usable as an iSIM, and a low-power MCU that is fully available for running customer applications. The Monarch NB02S module is 5G-ready and designed to enable massive IoT.

Applications

The Monarch NB02S module is ideal for adding NB-IoT connectivity to low data rate M2M and IoT devices for wide deployment, including utility meters, industrial sensors, asset trackers, and numerous additional smart home and smart city devices.

Monarch NB02S Module Evaluation Kit

The Monarch NB02S module evaluation kit enables world-wide connection to the cloud via NB-IoT networks in minutes. The evaluation kit also includes a schematic layout for reference and BOM design files for use in PCB designs.

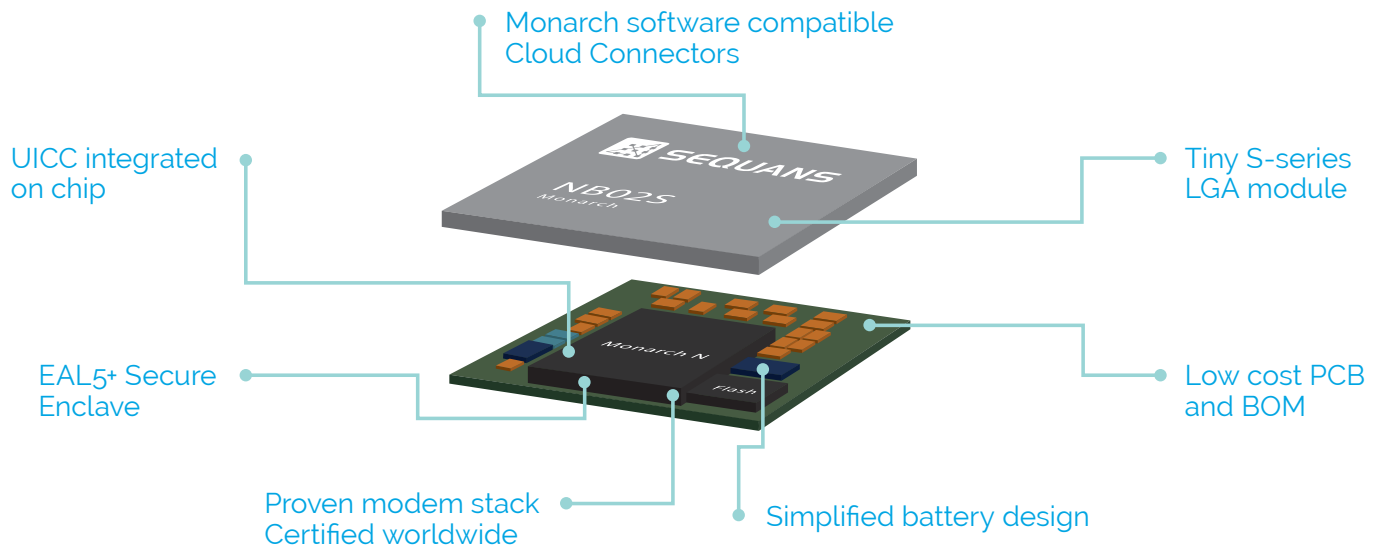
Integrated Security and iSIM

The Secure Enclave in Monarch N is Common Criteria EAL5+ certifiable and enables the iSIM function to operate within the module with no additional components, reducing operational complexity and cost for customers. The security grade of the Monarch NB02S module is the highest in the cellular industry, enabling government-grade security and allowing the provisioning of MNO or MVNO connectivity profiles in the module. Customers can also use the embedded Secure Enclave for secure key storage and cryptographic operations at application level.

Ultra-low Power Consumption

The ultra-low power consumption of the Monarch NB02S module reflects the significant improvement in power consumption of Sequans' next generation Monarch N chip. Sequans' proprietary Dynamic Power Management and eco-Paging™ technologies adapt sleep and active state power consumption according to use case, enabling 10-15 years of battery life for some IoT use cases. In addition, The Monarch NB02S module supports a single-rail power supply for a wide voltage range: 2.5V to 5.5V. This allows a direct battery connection without the need of buck-boost or DC/DC converters, enabling an NB02S design to be powered with 2 AA batteries.

NB-IoT Module Enabling Next-generation 5G Massive IoT



Product Characteristics

LTE Modem

- ❖ Tiny S-series LGA module
- ❖ Single-SKU with support for LTE bands: 1, 2, 3, 4, 5, 8, 12, 13, 14, 17, 18, 19, 20, 25, 26, 28, 66, 70, 71, 85
- ❖ Cat NB1 and NB2 with up to 120.7 kbps DL and 21 kbps UL
- ❖ 3GPP Release 14/15
- ❖ SMS
- ❖ Max transmit power up to +20 dBm

Interfaces

- ❖ JTAG
- ❖ I2C
- ❖ SPI
- ❖ ADC

- ❖ GPIO including multiple module wake inputs and high precision LTE-synchronized GPIOs
- ❖ UART x 4
- ❖ USIM
- ❖ ISO7816
- ❖ 50 ohm antenna interface

Software

- ❖ Field proven NB-IoT LTE software stack from Monarch
- ❖ Rich set of AT commands
- ❖ IP and non-IP data delivery
- ❖ LPP and certified LWM2M stack
- ❖ Cloud Connector™ for direct HTTPS MQTTS and for various cloud platforms

Environmental

- ❖ Operating temperature: -40° C to +85° C
- ❖ Storage: JEDEC MSL 3

Certifications (in 2020)

- ❖ GCF and PTCRB
- ❖ Country approvals: FCC (US), ISED (Canada), CE/RED (EU), JATE/TELEC (JP), NCC (Taiwan), IMDA (SGP), KCC (S.Korea)
- ❖ Carrier-specific approvals