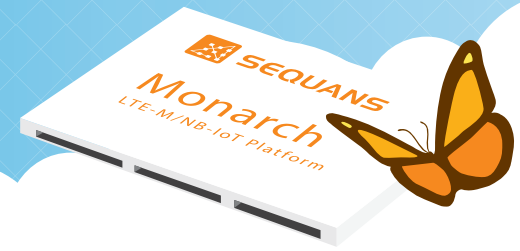


Monarch LTE Platform



Narrowband LTE Single Chip Cat M1/NB1 Solution for the Internet of Things

Monarch is a single-chip LTE Cat M1/NB1 solution designed specifically for narrowband IoT applications, including sensors, wearables, and other low data, low power M2M and IoT devices. Monarch complies with the ultra-low-power and reduced complexity feature requirements of the 3GPP release 13 LTE Advanced Pro standard, defining narrowband, low data rate LTE technology for machine-type-communications (MTC). Monarch achieves a very high level of integration whereby baseband, RF transceiver, power management, and RAM memory are integrated into a tiny 6.5 x 8.5 mm package, running Sequans' carrier-proven LTE protocol stack, an OMA lightweight M2M (LWM2M) client for over-the-air device management, and a rich set of AT commands.

Highlights

- 3GPP Release 13 LTE Advanced Pro
- Supports narrowband LTE UE categories M1/NB1
- Single chip 6.5 x 8.5 mm FC-CSP package
- Integrated baseband, RF, RAM memory, and power management
- Extended DRX and PSM features for long sleep duration use cases
- Programmable RF filtering for global band support in a single-SKU design
- Proprietary Dynamic Power Management (DPM) technology for 10 years operation
- Optimized for half-duplex FDD (HD-FDD) operation, also supports full-duplex FDD (FD-FDD)
- Throughput:
 - LTE UE category M1 (1.4 MHz bandwidth) up to 300 kbps DL/375 kbps UL in HD-FDD, and 1 Mbps in FD-FDD
 - LTE UE category NB1 (200 kHz bandwidth) up to 40 kbps DL/55 kbps UL in HD-FDD
- Single antenna system architecture
- Coverage enhancement methods
- Reduced Tx power class option
- Low power serial interfaces

Monarch LTE platform

Monarch is extremely cost and power-efficient, either as a standalone LTE solution or as a basis for LTE modules. Monarch has been highly optimized for cost-effective LTE device design, enabling Cat M1/NB1 LTE module cost to rival 2G module cost. Monarch provides the necessary IoT features along with extremely low power consumption at a low cost for an industry-leading price/performance capability.

Applications

Monarch is ideal for adding Cat M1 and/or Cat NB1 LTE connectivity to narrowband, low data rate M2M and IoT devices, including utility meters, industrial sensors, health and fitness bands, asset trackers, and numerous additional devices for smart home, smart city, and wearable applications.

Key Benefits of Monarch Cat M LTE Platform

Ultra small footprint

Monarch integrates all digital baseband, RF transceiver, RAM memory and power management functions. The IC is extremely compact due to advanced packaging techniques that have resulted in a very small 6.5 x 8.5 mm FC-CSP package footprint.

Optimized for low cost and low power

Monarch leverages a dozen years of Sequans' 4G chip design optimization experience. Its high-level of integration and highly-efficient architecture result in a very cost-effective chipset solution for price-sensitive IoT devices. Monarch's ultra-low power consumption—in PSM (power saving mode), extended DRX, and active modes—is best in class.

Proprietary Dynamic Power Management (DPM) low power technology

Additional low power capability is enabled by Sequans' proprietary Dynamic Power Management (DPM) technology, which adapts chipset sleep and active state power consumption based on use case to minimize power consumption for all IoT device types, enabling 10-15 year battery life for some IoT use cases.

Simple hardware integration

Host IoT devices can access the LTE network through a simple low power serial interface connected to the Monarch chip. And Monarch's tiny size facilitates placement and routing of LTE functions into space-constrained applications. Only a single power supply voltage is required, and both active and sleep mode power consumption is optimized to enable long battery life* on very small battery capacity.

Programmable on chip RF filtering

Monarch's versatile RF architecture supports programmable intelligent RF filtering that greatly simplifies RF front-end complexity, reducing bill-of-materials, cost, and footprint while providing a total solution for the design of single SKU devices supporting global LTE bands.

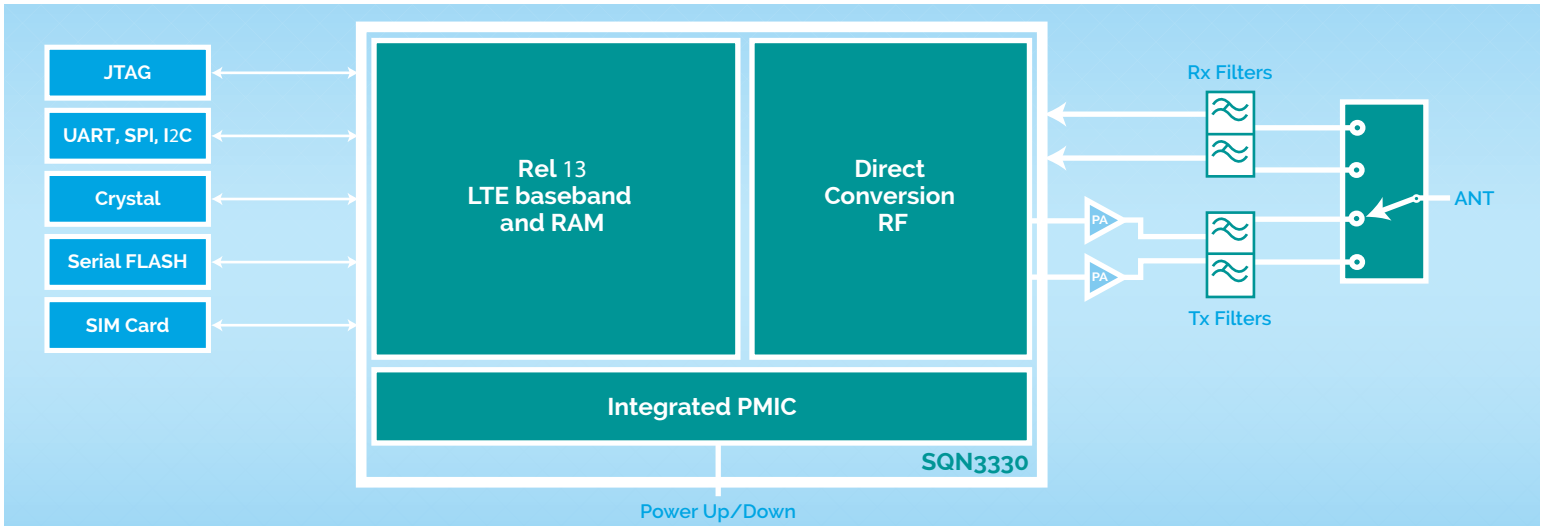
Simple software integration into IoT devices

Monarch's comprehensive software suite is based on more than a dozen years of proven field experience. With certifications and deployments in major LTE networks around the world, it is one of the most mature software solutions in the global 4G ecosystem. It includes the entire LTE Release 13 software stack and other drivers and applications required for a complete LTE system. Integration into all major operating systems (including Android, Android Wear, Linux, Windows and various Real Time operating systems) is simplified thanks to a complete set of AT commands for M2M applications. The standard-compliant OMA LWM2M client enables remote management of device over-the-air. A field diagnostic tool and an RF calibration software tool are provided for faster time-to-market.

Extended coverage

Monarch implements the most advanced coverage enhancement techniques to provide superior network coverage and performance. Compared to legacy LTE systems, Monarch adds up to 20dB link budget, thus enabling to address challenging environments, in particular in-building.

Monarch SQN3330 LTE Cat M1/NB1 Platform block diagram



Product characteristics

Baseband Features SQN3330

Product Features

- Single 6.5 x 8.5 mm FC-CSP package integrates baseband + RF transceiver + RAM + power management
- 40 nm low power CMOS technology

LTE Modem

- Supports narrowband channel sizes defined in 3GPP Release 13 LTE Advanced Pro standard for machine type communications: 1.4 MHz and 200 kHz bandwidths
- Configurable support for LTE UE Cat M1/NB1
- Optimized for single Rx and HD-FDD operation
- Coverage enhancement (mode A and mode B) with frequency hopping and time repetition
- Supports all DL/UL and special sub-frame configurations
- Improved scanning performance for deep indoor coverage
- Standard 3GPP security, integrity, ciphering algorithms
- Intra/inter-frequency handover
- Supports PSM and extended DRX for long sleep duty cycles
- IPv4/v6

- SMS MO and MT message support
- OMA LWM2M for device management

Interfaces

- Serial interfaces: high-speed UART, I2C, SPI
- High speed, low power, serial flash interface
- USIM

RF Transceiver

- Optimized for half-duplex FDD; also supports FD-FDD and TDD
- Support for programmable RF filtering, enabling simple, single-SKU hardware designs supporting global LTE bands
- Optimized for single Tx/Rx
- 699 MHz to 2.7 GHz
- Supports normal (+23 dBm) and reduced (+20 dBm) Tx power class option

System Power Management

- Single power supply powering embedded voltage converters to simplify device supply tree
- Real time clock and alarm
- Fast wake-up and power saving modes
- Dynamic Power Management technology optimizes energy efficiency based on traffic patterns and active/sleep duty cycles

streamLITE^{LTE}

StreamliteLTE is Sequans' product line for devices for the Internet of Things. StreamliteLTE solutions provide an ideal balance of IoT features and low cost, enabling affordable, mass market, M2M and IoT devices.