NXP ultra-low-power wireless microcontroller JN5169

+10 dBm Tx new-gen home automation & lighting with ZigBee & IEEE 802.15.4

These advanced, ultra-low-power wireless microcontrollers for ZigBee and IEEE 802.15.4 integrate power amplifiers with exceptionally high transmit power (up to +10 dBm), making it possible to create smarter, more secure systems that use less energy.

KEY FEATURES

- 2.4 GHz IEEE 802.15.4-compliant radio
- 128-bit AES security processor
- MAC accelerator with packet formatting, CRCs, address check, auto-acks, timers
- Integrated ultra-low-power sleep oscillator (0.7 µA)
- 2.0 to 3.6 V battery operation
- Deep-sleep current: 50 nA (wake-up from I/O)
- Low external component cost
- Compensation for temperature drift of X-tals frequency
- Rx current = 13 mA, Rx sensitivity = -96 dBm
- Configurable transmit power (e.g. 10 dBm/23.3 mA, 8.5 dBm/19.6 mA, 3 dBm/14 mA)
- Radio link budget of 106 dB
- 32-bit RISC CPU, clock speed up to 32 MHz
- Variable instruction width for high coding efficiency
- Multi-stage instruction pipeline
- Onchip memory: 512 kB Flash, 32 kB RAM, 4 kB EEPROM
- ZigBee PRO stack with HA, LL, and SE profile
- 2-wire I^2C-bus serial interface (master or slave)
- Antenna diversity (Auto Rx)
- Five PWMs (Four timers, one timer/counter)
- Two low-power sleep counters
- Two UARTs
- SPI-bus master and slave port, three selects
- Voltage brownout with eight programmable thresholds
- 4-input 10-bit ADC, comparator
- Battery and temperature sensors
- Watchdog timer and POR
- Up to 20 digital I/O
- Temp range: -40 to +125 °C

KEY BENEFITS

- Single-chip device runs stack and application
- Support for several network stacks
- Highly featured 32-bit RISC CPU for high performance

KEY APPLICATIONS

- Internet of Things (IoT)
- Home and building automation
- Smart lighting
- Energy-harvesting sensors and switches
- Remote controls
- Smart energy
- Wireless sensor networks

The NXP JN5169 is a highly featured wireless microcontrollers that include a 32-bit RISC CPU, a 2.4 GHz IEEE 802.15.4-compliant transceiver, and a mix of analog and digital peripherals. It includes 512 kB embedded Flash, 32 kB RAM, and 4 kB EEPROM memory, allowing OTA upgrade capability without external memory.

The 32-bit RISC CPU offers high coding efficiency through variable-width instructions, a multi-stage instruction pipeline, and low-power operation with programmable clock speeds. The best-in-class Rx operating current (down to 13 mA and with a 0.7 µA sleep timer mode) gives excellent battery life and allows direct operation from a coin cell.

The JN5169 integrates a 10 dBm power amplifier. This greatly extends operating range, and thus improves the robustness of connectivity.

The architecture includes a temperature-dependent, crystal-pulling feature that allows for use of very low-cost crystals, specified at 85 °C, even in a smart lighting application specified for 125 °C.

The on-chip peripherals support a wide range of applications. They include a 2-wire I²C-bus and SPI-bus that can operate as either master or slave, a 6-channel ADC with a battery monitor, and a temperature sensor. The architecture can support a large switch matrix of up to 100 elements or, alternatively, a 40-key capacitive touch pad.

JN5169 EVALUATION KIT – JN5169-EK004

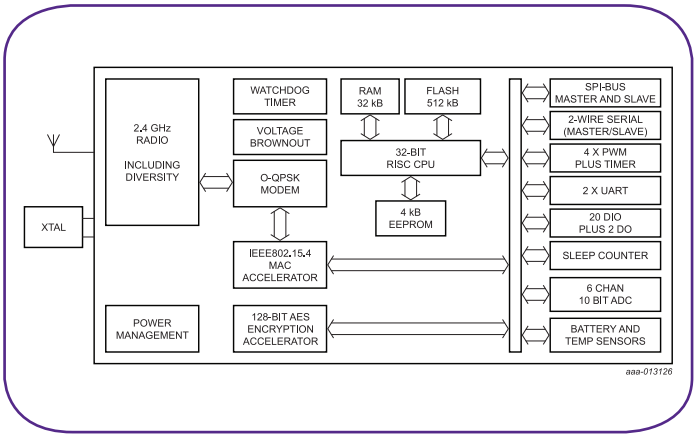
The NXP JN5169-EK004 evaluation kit is specifically designed for use with the NXP JN5169 wireless microcontroller.

This comprehensive kit – which includes a series of wireless carrier boards, plug-in expansion boards, USB dongles, a remote control, a Raspberry Pi single-board computer (with programmed micro-SDcard to act as a border-router), and a complete software design kit – provides everything necessary for system development.

The evaluation kit also simplifies the development of systems that run ZigBee or IEEE 802.15.4 network stacks, enabling easy and secure NFC commissioning. NFC provides the best, simplest, and most secure way to install a smart home-automation system.

TECHZONE RESOURCES

NXP's TechZone site for wireless connectivity (www.nxp.com/techzones/wireless-connectivtiy/overview.html) provides free access to application notes that include descriptions and examples of the protocols and profiles supported by the JN516x family.



JN5169 block diagram

JN516x series selection guide, with JN5169 highlighted

	Tx power	Tx current	Rx sensitivity	Rx current	Flash	RAM	EEPROM
JN5161	+2.5 dBm	15 mA	-95 dBm	17 mA	64 kB	8 kB	4 kB
JN5164	+2.5 dBm	15 mA	-95 dBm	17 mA	160 kB	32 kB	4 kB
JN5168	+2.5 dBm	15 mA	-95 dBm	22 mA	256 kB	32 kB	4 kB
JN5169	+10 dBm	23.3 mA	-96 dBm	13 mA	512 kB	32 kB	4 kB

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