



RSN-CC530 User Manual

June 2025

Features

- Adapt to the 2.4-GHz IEEE 802.15.4 RF transceiver
- Programmable output power up to 21 dBm
- 16-mm × 28-mm Stamps package
- Active Mode RX (CPU Idle): 27 mA
- Active Mode TX 20dBm (CPU Idle): 166mA
- Power mode 1 (4 μ S wake-up): 0.2 mA
- Power mode 2(Sleep timer running): 1 μ A
- Power mode 3 (external interrupt): 0.4 μ A
- Wide supply voltage range (2 V-3.6 V)
- 256-KB system programmable flash
- 8-KB RAM, has number holding capacity under
- IR generation circuit
- 32-kHz sleep timer with capture functionality
- Hardware support CSMA/CA
- Support accurate digitization RSSI/LQI
- Battery monitor and temperature sensor
- 7 inputs and configurable resolution 12-bit ADC
- AES Security coprocessor
- 2 Powerful USART supports a variety of serial
- Communications protocol
- 18 general I / O pins (17 × 4 mA, 20 mA)
- Watchdog Timer



Introduction

The RSN-GB2530 module is fully compliant with the IEEE 802.15.4 standard, which forms the basis for ZigBee PRO, 6LoWPAN, and several other low-power wireless protocols. When combined with the TI Z-Stack or any other ZigBee-compliant network stack, these modules provide a robust and flexible platform for implementing a wide range of ZigBee profiles and applications.

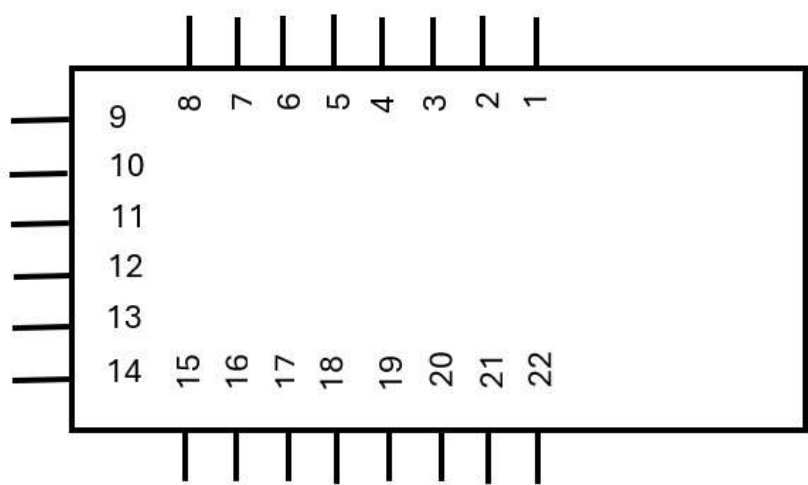
Each module integrates certified RF components and CC2530, a powerful microcontroller from Texas Instrument (TI) which can run the entire ZigBee mesh network stack, including application-layer processing.

This makes the RSN-GB2530 module well-suited for use as a full-function device (FFD) in ZigBee networks.

Using a pre-certified module is the fastest and most efficient way to develop a ZigBee-enabled product, significantly reducing both development time and time to market. The RSN-GB2530 module comes fully tested and qualified, with all necessary RF and MCU resources onboard, minimizing the need for additional RF design or engineering expertise.

For simple applications—such as a battery-powered wireless light switch—only a power source and a pushbutton are needed to create a complete, functional device.

Pin assignment RSN-GB2530



Pin Description RSN-GB2530

	Pin name	Description
1	GND	System ground
2	VDD	Supply voltage input
	P2_2/DC	Debug Clock P2 [2]. Debug interface is used for programming.
4	P2_1/DD	Debug Clock P2 [2]. Debug interface is used for programming.
5	P2_0	CC2530 GPIO P2 [0]
6	P1_7	CC2530 GPIO P1 [7]/ SPI MISO
7	P1_6	CC2530 GPIO P1 [6]/SPI MOSI
8	P1_5	CC2530 GPIO P1 [5]/SPI CLK
9	P2_3/32kHz_Q2	32 kHz crystal oscillator
10	P1_3	CC2530 GPIO P1[3]
11	P1_2	CC2530 GPIO P1[2]

12	P2_4/32kHz_Q1	32 kHz crystal oscillator
13	P1_0	CC2530 GPIO P1 [0]
14	P0_7	CC2530 GPIO P0 [7]
15	P0_6	CC2530 GPIO P0 [6]
16	P0_5	CC2530 GPIO P0 [5]
17	P0_4	CC2530 GPIO P0 [4]
18	P0_3	CC2530 GPIO P0 [3]/ UART TX
19	P0_2	CC2530 GPIO P0 [2]/ UART RX
20	P0_1	CC2530 GPIO P0 [1]
21	P0_0	CC2530 GPIO P0 [0]
22	RESET	CC2530 RESET_N. Active Low

MCU: Texas Instruments (TI) CC2530, and RF front end RFX2401C connections:

CC2530	RFX2401C
P1_1	TXEN
P1_4	RXEN

Firmware: Not included, but ZigBee and IEEE 802.15.4 firmware can be downloaded for free from www.ti.com.

Circuit Description

The module features two serial interfaces that can be individually configured as either UART or SPI, offering flexible communication options. It provides a total of 19 general-purpose I/O (GPIO) pins for user applications. Of these, 8 pins can be assigned to the internal analog-to-digital converter (ADC), which supports resolutions between 8 and 12 bits. All I/O pins support interrupt functionality for responsive event-driven operation.

The integrated microcontroller includes multiple low-power operating modes designed to minimize current consumption, making the module ideal for battery-powered systems. An optional internal 32 kHz crystal oscillator is available for real-time clock (RTC) and timer-based applications.

The module incorporates an internal power-on reset (POR) circuit and a brown-out detector to enhance power reliability. However, for optimal protection against power faults, the addition of an external supervisory reset circuit is strongly recommended.

For detailed specifications and performance characteristics of the system-on-chip (SoC) transceiver, including the Texas Instruments CC2530 and RFX2401C components, please refer to the respective datasheets.

The IEEE 802.15.4 standard defines a global framework for low-data-rate wireless personal area networks (WPANs), optimized for short-range communication, extended battery life, and low system complexity. It specifies both the Physical (PHY) and Medium Access Control

(MAC) layers of the network stack. Two primary versions of the standard are in use: IEEE 802.15.4-2003 and IEEE 802.15.4-2006. The 2003 version serves as the foundational protocol for ZigBee. Typical applications include smart metering, home and building automation, industrial monitoring and control, wireless sensor networks, remote control systems, and consumer electronics.

This module is fully compliant with the IEEE 802.15.4 standard and operates in the 2.45 GHz ISM band. It employs direct sequence spread spectrum (DSSS) modulation with a chip rate of 2 MPs, achieving a maximum raw data throughput of 250 kbps. In the 2.45 GHz band, 16 channels are available, designated as channels 11 through 26.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

The host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

The end user manual shall include all required regulatory information/warning as shown in this manual, include:

This product must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

RF exposure warning

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

The final end product must be labeled in a visible area with the following: Contains FCC ID: **2BNXA-RSNSX11**.

Antenna type: DIPOLE

Antenna Gain: 2.2 dBi