

Low-Power Sub-1 GHz RF Transceiver (Enhanced **CC1100**)

Applications

- Ultra low-power wireless applications operating in the 315/433/868/915 MHz ISM/SRD bands
- Wireless alarm and security systems
- Industrial monitoring and control
- Wireless sensor networks
- AMR – Automatic Meter Reading
- Home and building automation
- Wireless MBUS

Product Description

The **CC1101** is a low-cost sub-1 GHz transceiver designed for very low-power wireless applications. The circuit is mainly intended for the ISM (Industrial, Scientific and Medical) and SRD (Short Range Device) frequency bands at 315, 433, 868, and 915 MHz, but can easily be programmed for operation at other frequencies in the 300-348 MHz, 387-464 MHz and 779-928 MHz bands.

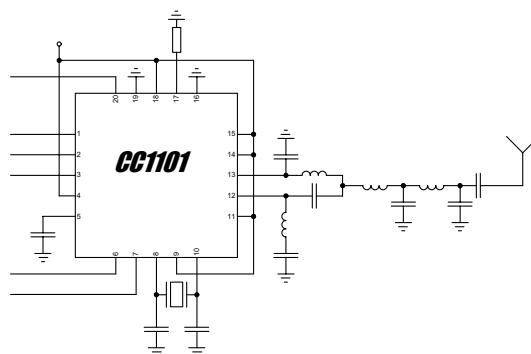
CC1101 is an improved and code compatible version of the **CC1100** RF transceiver. The main improvements on the **CC1101** include [1]:

- Improved spurious response
- Better close-in phase noise thus improved Adjacent Channel Power (ACP) performance
- Higher input saturation level
- Improved output power ramping
- Extended frequency bands of operation, i.e.
CC1100: 400-464 MHz and 800-928 MHz
CC1101: 387-464 MHz and 779-928 MHz

The RF transceiver is integrated with a highly configurable baseband modem. The modem supports various modulation formats and has a configurable data rate up to 500 kBaud.

CC1101 provides extensive hardware support for packet handling, data buffering, burst transmissions, clear channel assessment, link quality indication, and wake-on-radio.

The main operating parameters and the 64-byte transmit/receive FIFOs of **CC1101** can be controlled via an SPI interface. In a typical system, the **CC1101** will be used together with a microcontroller and a few additional passive components.



This product shall not be used in any of the following products or systems without prior express written permission from Texas Instruments:

- implantable cardiac rhythm management systems, including without limitation pacemakers, defibrillators and cardiac resynchronization devices,*
- external cardiac rhythm management systems that communicate directly with one or more implantable medical devices; or*
- other devices used to monitor or treat cardiac function, including without limitation pressure sensors, biochemical sensors and neurostimulators.*

Please contact lpw-medical-approval@list.ti.com if your application might fall within the category described above.

Key Features

RF Performance

- High sensitivity (–112 dBm at 1.2 kBaud, 868 MHz, 1% packet error rate)
- Low current consumption (14.7 mA in RX, 1.2 kBaud, 868 MHz)
- Programmable output power up to +12 dBm for all supported frequencies
- Excellent receiver selectivity and blocking performance
- Programmable data rate from 1.2 to 500 kBaud
- Frequency bands: 300-348 MHz, 387-464 MHz and 779-928 MHz

Analog Features

- 2-FSK, GFSK, and MSK supported as well as OOK and flexible ASK shaping
- Suitable for frequency hopping systems due to a fast settling frequency synthesizer; 90 µs settling time
- Automatic Frequency Compensation (AFC) can be used to align the frequency synthesizer to the received signal centre frequency
- Integrated analog temperature sensor

Digital Features

- Flexible support for packet oriented systems; On-chip support for sync word detection, address check, flexible packet length, and automatic CRC handling
- Efficient SPI interface; All registers can be programmed with one “burst” transfer
- Digital RSSI output
- Programmable channel filter bandwidth
- Programmable Carrier Sense (CS) indicator

- Programmable Preamble Quality Indicator (PQI) for improved protection against false sync word detection in random noise
- Support for automatic Clear Channel Assessment (CCA) before transmitting (for listen-before-talk systems)
- Support for per-package Link Quality Indication (LQI)
- Optional automatic whitening and de-whitening of data

Low-Power Features

- 200 nA sleep mode current consumption
- Fast startup time; 240 µs from sleep to RX or TX mode (measured on EM reference design [2] and [3])
- Wake-on-radio functionality for automatic low-power RX polling
- Separate 64-byte RX and TX data FIFOs (enables burst mode data transmission)

General

- Few external components; Completely on-chip frequency synthesizer, no external filters or RF switch needed
- Green package: RoHS compliant and no antimony or bromine
- Small size (QLP 4x4 mm package, 20 pins)
- Suited for systems targeting compliance with EN 300 220 (Europe) and FCC CFR Part 15 (US)
- Suited for systems targeting compliance with the Wireless MBUS standard EN 13757-4:2005
- Support for asynchronous and synchronous serial receive/transmit mode for backwards compatibility with existing radio communication protocols