

# CC1110

▶ 315/433/868/915 MHz  
SoC RF SOLUTION

## 315/433/868/915 MHz RADIO TRANSCEIVER, SINGLE-CYCLE 8051 MCU AND 32 kB FLASH MEMORY – ALL IN ONE CHIP

The CC1110 is a powerful 315/433/868/915 MHz System-on-Chip designed for low-power and low-voltage wireless communication applications. With a multi-channel 315/433/868/915 MHz radio transceiver, a single-cycle 8051 microcontroller and 32 kB Flash memory, this unique all-in-one device makes it easier than ever to finish your design while offering numerous application possibilities.

The 315/433/868/915 MHz CC1110 System-on-Chip (SoC) is a low-cost device containing the industry leading CC1100 RF transceiver and a high performance, low-power 8051-based microcontroller with integrated 32 kB Flash memory and peripherals. Also included is 4 kB SRAM, an AES security coprocessor, an 8 – 14 bits ADC with up to eight inputs, and many other powerful features.

The CC1110 is highly suited for systems where ultra-low power consumption is required, as it offers a range of different power modes that reduce current consumption. The start-up time from low-power modes to active mode is exceptionally fast with the CC1110. The SoC also supports wake-up from power-down mode either triggered by an external interrupt (supported on all pins) or a real-time counter event.

During receive and transmit modes the current consumption of the CC1110 is as low as 22 mA and 31 mA (at 0 dBm output power), respectively. The CC1110 is ideally suited for use in many different frequency bands: micro-power 315 MHz in Japan, 433 MHz in Europe and the US, 868 MHz in Europe and 902-928 MHz in the US.

The CC1110 SoC is integrated with a highly configurable base band modem. The modem supports various modulation formats and has a configurable data rate up to 500 kbps.

Very few external components are required for the CC1110. No external filters or Tx/Rx switches are used. All components used are of a low-cost type (no tight-tolerance passive components). The CC1110 SoC comes in a RoHS compliant 6x6 mm package.

## ▶ WORLD-CLASS DEVELOPMENT TOOLS

The CC1110 tightly integrates the MCU core, software and the RF transceiver, making this System-on-Chip solution very easy to use.

CC1110 is supported by a powerful and flexible integrated development environment as well as a comprehensive development kit. The kit includes CC1110 hardware, software and tools, making it easy to start using the SoC and to get the robust RF-links up and running quickly.

## ▶ APPLICATIONS

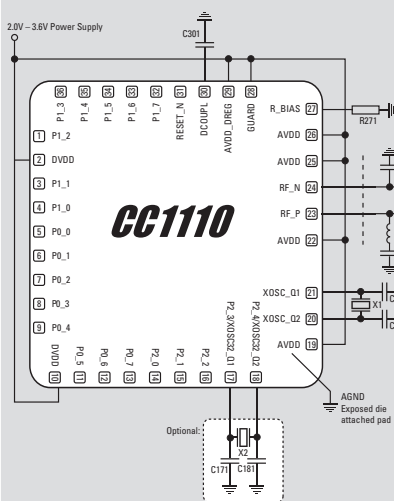
- AMR
- Active RF-ID systems
- Alarm & security systems
- Home automation
- Telemetry
- Wireless payment systems

## GENERAL CHARACTERISTICS

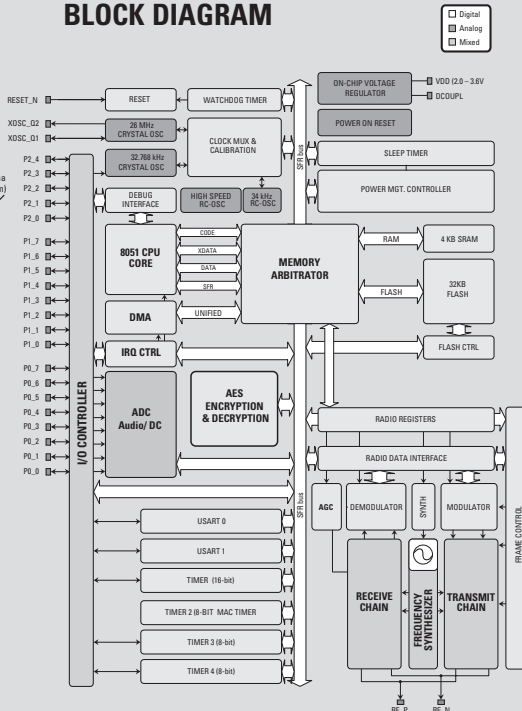
PARAMETER	MIN	TYP	MAX	UNIT	CONDITION
<b>OPERATING CONDITIONS:</b>					
Operating temperature	-40		85	°C	
Operating supply voltage	2.0		3.6	V	
<b>CURRENT CONSUMPTION:</b>					
MCU active and RX mode		22		mA	MCU running at full speed (26 MHz), radio in RX mode
MCU active and TX mode, 0 dBm		31		mA	MCU running at full speed (26 MHz), radio in TX mode, 0 dBm output power
Power mode 2		0.8		µA	32 kHz RC-oscillator (or 32,768 kHz crystal oscillator) and sleep timer running
Power mode 3		0.6		µA	No clocks running. Power On Reset (POR) active. Can wake up on external interrupt
<b>WAKE-UP AND TIMING:</b>					
From power mode 2 or 3 to active		50		µs	Digital regulator and high-speed oscillators off. Start-up of regulator and high-speed RC-oscillator
From active to RX or TX		195		µs	Time from enabling the 26 MHz crystal oscillator and the radio part until RX or TX starts
<b>RF CHARACTERISTICS:</b>					
Frequency range	315		915	MHz	
Data rate (programmable)	1.2		500	kbps	
Output power (programmable)	-30		10	dBm	
Receiver sensitivity, 10 kbps		-109		dBm	2-FSK, 250 kHz RX filter bandwidth, 1%PER
Receiver sensitivity, 250 kbps		-87		dBm	2-FSK, 540 kHz RX filter bandwidth, 1%PER



## APPLICATION CIRCUIT DIAGRAM



## BLOCK DIAGRAM



## FEATURES

- High-performance and low-power RF transceiver core – the industry leading CC1100
- High performance and low power 8051 microcontroller core, typically with 8 times the performance per MHz of a standard 8051
- 32 kB in-system programmable flash
- 4 kB SRAM (with data retention in all power modes)
- Powerful DMA functionality
- Four flexible power modes for reduced power consumption
- System clock source can be 16 MHz on-chip RC oscillator or 26 MHz crystal oscillator. The 26 MHz oscillator is used when radio is active
- Real time clock with low-power 32,768 kHz crystal oscillator or internal low-power 34 kHz RC-oscillator
- Very fast transition times from sleep modes to active enables ultra low average power consumption in low duty-cycle systems
- In deep sleep modes the system can wake up on external interrupts or real time counter events
- High sensitivity
- Excellent receiver selectivity and blocking performance
- Programmable data rate up to 500 kbps
- 2-FSK, GFSK and MSK supported
- Low current consumption. Total: RX: 22 mA, TX: 31 mA (at 0 dBm output power) with microcontroller running at 26 MHz
- Digital RSSI / LQI support
- Digital Battery monitor
- Ideal for frequency hopping systems and multichannel operation
- Burst mode data transmission possible
- Very few external components: Complete on-chip frequency synthesizer, no external filters or RF switch needed
- 8-14 bits ADC with up to eight inputs
- Wide supply voltage range (2.0V – 3.6V)
- Two USARTs
- Programmable Watchdog timer
- Power On Reset
- On-chip temperature sensor
- 16-bit timer + three 8-bit timers
- True random number generator
- Hardware debug support
- 21 general I/O pins, two with 20 mA sink/source capacity
- Dual data pointers
- In-circuit interactive debugging is supported for the industry standard IAR C-SPY IDE via a simple two-wire serial interface
- Powerful and flexible development tools and reference designs available
- RoHS compliant 6x6 mm QLP36 package

## ABOUT CHIPCON

Chipcon is a leading international semiconductor company that designs, produces and markets high performance standard radio frequency integrated circuits (RF-ICs) for use in a variety of wireless applications in the 300 to 1000 MHz and 2.4 GHz frequency bands. Chipcon targets both consumer electronics and home and building automation end markets and has a strong position within both proprietary and standards-based radio technologies.

Chipcon Group ASA is the parent company and holding company that controls the activities of its wholly owned subsidiaries Chipcon AS and Chipcon Inc. Chipcon's products are distributed worldwide and we are represented at 55 locations in 31 countries.

**TEXAS  
INSTRUMENTS**

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