FCC ID: SQO87050R03

Applicant: EVER SPARKLE TECHNOLOGIES LTD.

Circuit Description

CC2500 is the transceiver of Wii Wireless WING,The CC2500 is a low cost true single chip 2.4GHz transceiver designed for very low power wireless application .The circuit is intended for the ISM (Industrial,Scientific and Medical) and SRD(Short Range Device) frequency band at 2400-2483.5MHz.

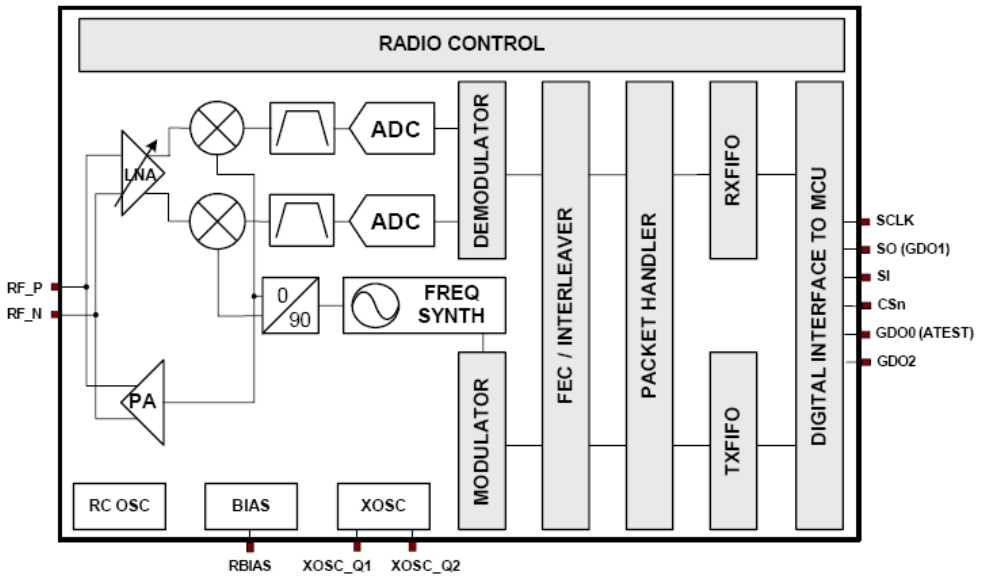

Figure 2: *CC2500* Simplified Block Diagram

A simplified block diagram of ***CC2500*** is shown in Figure 2.

CC2500 features a low-IF receiver. The received RF signal is amplified by the low-noise amplifier (LNA) and down-converted in quadrature (I and Q) to the intermediate frequency (IF). At IF, the I/Q signals are digitised by the ADCs. Automatic gain control (AGC), fine channel filtering, demodulation bit/packet synchronization is performed digitally.

The transmitter part of ***CC2500*** is based on direct synthesis of the RF frequency. The frequency synthesizer includes a completely on-chip LC VCO and a 90 degrees phase shifter for generating the I and Q LO signals to the down-conversion mixers in receive mode.

A crystal is to be connected to XOSC_Q1 and XOSC_Q2. The crystal oscillator generates the reference frequency for the synthesizer, as well as clocks for the ADC and the digital part.

A 4-wire SPI serial interface is used for configuration and data buffer access.

The digital baseband includes support for channel configuration, packet handling and data buffering.

16 Application Circuit

Only a few external components are required for using the ***CC2500***. The recommended application circuit is shown in Figure 3. The external components are described in Table 14, and typical values are given in Table 15. Note that the PCB antenna alternative indicated in Figure 3 is preliminary and subject to changes. Performance for the PCB antenna alternative will be included in future revisions of this data sheet.

Bias resistor

The bias resistor R171 is used to set an accurate bias current.

Balun and RF matching

C122, C132, L121 and L131 form a balun that converts the differential RF port on ***CC2500*** to a single-ended RF signal (C121 and C131 are also needed for DC blocking). Together with an appropriate LC network, the balun components also transform the impedance to match a 50Ω antenna (or cable). Component values for the RF balun and LC network are easily found using the SmartRF® Studio software. Suggested values are listed in Table 15.

Crystal

The crystal oscillator uses an external crystal with two loading capacitors (C81 and C101). See section 34 on page 36 for details.

Power supply decoupling

The power supply must be properly decoupled close to the supply pins. Note that decoupling capacitors are not shown in the application circuit. The placement and the size of the decoupling capacitors are very important to achieve the optimum performance. Chipcon provides a reference design that should be followed closely.

Component	Description
C51	100nF decoupling capacitor for on-chip voltage regulator to digital part
C81/C101	Crystal loading capacitors, see section 34 on page 36 for details
C121/C131	RF balun DC blocking capacitors
C122/C132	RF balun/matching capacitors
C123/C124	RF LC filter/matching capacitors
L121/L131	RF balun/matching inductors (inexpensive multi-layer type)
L122	RF LC filter inductor (inexpensive multi-layer type)
R171	56kΩ resistor for internal bias current reference
XTAL	26MHz-28MHz crystal, see section 34 on page 36 for details

The 26M crystal is to be connected to XOSC_Q1 and XQSC_Q2 . The crystal oscillator generates the reference frequency for the synthesizer, as weel as clocks for the ADC and the digital part.
The 12M Crystal is to be connected to MUS2008NSC.

Antenna, Ground, and Power Source

The antenna consists of a 45cm long telescoping chrome over brass tubing. There is no external ground connection. The ground is only that of the printed circuit board. The power supply is supplied by two 2”AAA Battery which is insert to wing wireless controller.