Vehicle Badge Tag V1

Description of the EUT system/test Item:

Product name: Vehicle AGPS Tag V1 SA91004201

General Description:

The SA Tag is used to track assets in real time. It is based on an RF transceiver and a microcontroller.
It uses the Precyse N3 proprietary protocol which provides a 2 way, half duplex communication with the base station.
The unit is powered by a vehicle battery.

Specifications:

Frequency:	905-917.14MHz ISM license free band
Number of Channels:	16
Modulation:	2-FSK
Channel bandwidth:	800 KHz
EIRP:	Up to 17dBm, digitally controlled
Communication protocol:	N3.
Transmission:	Event base and on demand
External interfaces:	3 user buttons, buzzer, GPS receiver.
Internal sensors:	Motion, temperature sensors.
Antenna Gain:	0 dBi

Clock frequencies:

Frequency [MHz]	Location
26MHz	near transceiver
32.768KHz	near microcontroller

6 Circuit Description

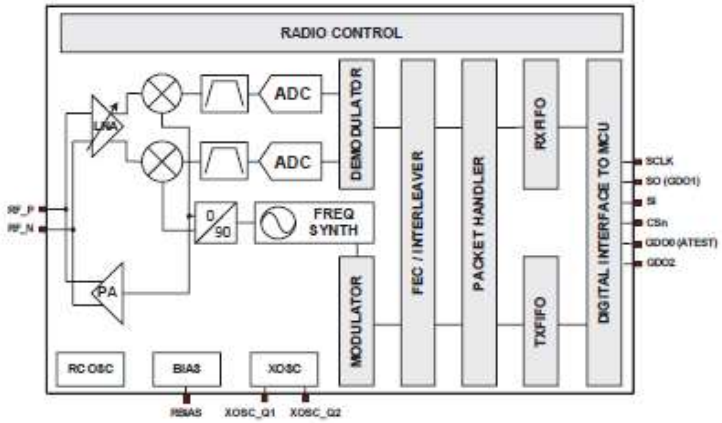


Figure 9: CC1101 Simplified Block Diagram

A simplified block diagram of CC1101 is shown in Figure 9.

CC1101 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, and bit/packet synchronization are performed digitally.

The transmitter part of CC1101 is based on direct synthesis of the RF frequency. The frequency synthesizer includes a completely on-chip LC VCO and a 90 degree 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.

7 Application Circuit

Only a few external components are required for using the CC1101. The recommended application circuits for CC1101 are shown in Figure 10 and

Figure 11. The external components are described in Table 20, and typical values are given in Table 21.

The 315 MHz and 433 MHz CC1101EM reference design [1] use inexpensive multi-layer inductors. The 868 MHz and 915 MHz CC1101EM reference design [2] use wire-wound inductors as this give better output power, sensitivity, and attenuation of harmonics compared to using multi-layer inductors. Refer to design note DN032 [24] for information about performance when using wire-wound inductors from different vendors. See also Design Note DN013 [15], which gives the output power and harmonics when using *multi-layer* inductors. The output power is then typically +10 dBm when operating at 868/915 MHz.

7.1 Bias Resistor

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

CC1190 PA-LNA Data Sheet

850 – 950 MHz RF Front End

Check for Samples: CC1190

FEATURES

- Seamless Interface to Sub-1 GHz Low Power RF Devices from Texas Instruments
- Up to 27 dBm (0.5 W) Output Power
- 6 dB Typical Sensitivity Improvement with CC11xx and CC430
- Few External Components
  - Integrated PA
  - Integrated LNA
  - Integrated Switches
  - Integrated Matching Network
  - Integrated Inductors
- Digital Control of LNA and PA Gain by HGM Pin
- 50-nA in Power Down (LNA_EN = PA_EN = 0)
- High Transmit Power Efficiency
  - PAE = 50% at 26 dBm Output Power
- Low Receive Current Consumption
  - 3 mA for High Gain Mode
  - 26 µA for Low Gain Mode
- 2.9 dB LNA Noise Figure, Including Switch and External Antenna Match
- RoHS Compliant 4-mm × 4-mm QFN-16 Package
- 2 V to 3.7 V Operation

APPLICATIONS

- 850 - 950 MHz ISM Bands Wireless Systems
- Wireless Sensor Networks
- Wireless Industrial Systems
- IEEE 802.15.4 Systems
- Wireless Consumer Systems
- Wireless Metering (AMR/AMI) Systems
- Smart Grid Wireless Networks

DESCRIPTION

CC1190 is a cost-effective and high-performance RF Front End for low-power and low-voltage wireless applications at 850 - 950 MHz.

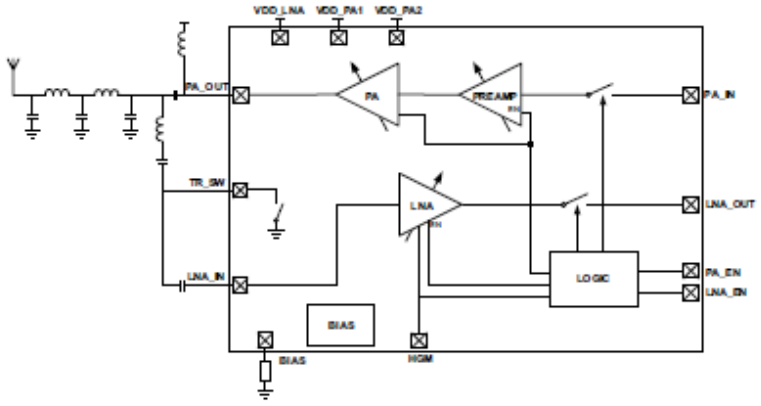
CC1190 is a range extender for the sub-1 GHz low-power RF transceivers, transmitters, and System-on-Chip devices from Texas Instruments.

CC1190 integrates a power amplifier (PA), a low-noise amplifier (LNA), switches, and RF matching for the design of a high-performance wireless systems.

CC1190 increases the link budget by providing a power amplifier for increased output power, and an LNA with low noise figure for improved receiver sensitivity.

CC1190 provides an efficient and easy-to-use range extender in a compact 4-mm × 4-mm QFN-16 package.

CC1190 BLOCK DIAGRAM



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