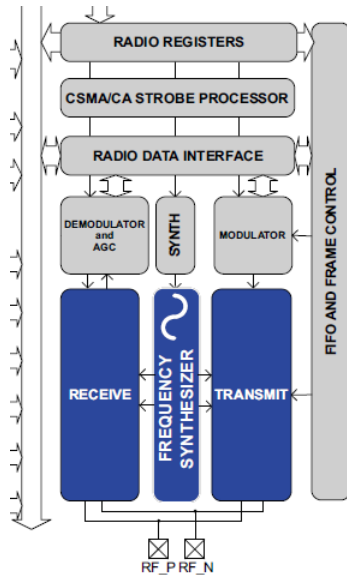
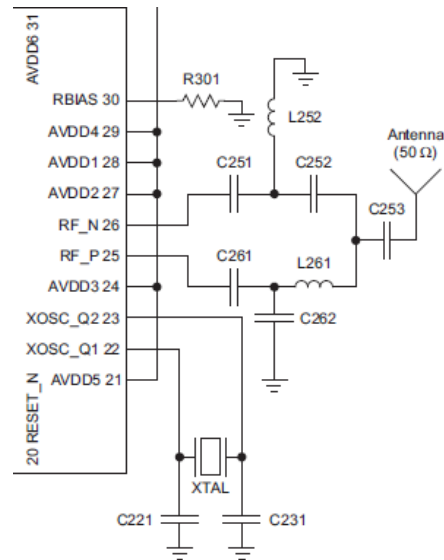


JOYSTICK RF OPERATION DESCRIPTION



RF Block Diagram



RF and Antenna Application Circuit

RF Core Operation

The RF module works with 2.4GHz and features an IEEE 802.15.4-compliant radio transceiver. The RF core controls the analog radio modules. Categorized as Low Rate WPAN. A highly integrated RF module designed for low cost and low power consumption.

RF Transceiver Architecture

The RF includes digital direct sequence spread spectrum baseband modem providing a spreading gain of 9 dB and an effective data rate of 250 kbps.

Featuring DSSS baseband modem with two MChips/s, using modulation format defined in IEEE 802.15.4-2006. The modulation and spreading functions dividing bit-stream (LSB First) data transmitted into DACs as modulated signal. Each byte is divided into two symbols, 4 bits each. The least-significant symbol is transmitted first. For multi-byte fields, the least-significant byte is transmitted first, except for security-related fields, where the most-significant byte is transmitted first.

The **demodulator** is responsible for retrieving the over-the-air data from the received signal. The amplitude information from the demodulator is used by the **automatic gain control (AGC)**. The AGC adjusts the gain of the analog LNA so that the signal level within the receiver is approximately constant.

The **frame filtering and source matching** supports the FSM in the RF Core by performing all operations needed in order to do frame filtering and source address matching, as defined by IEEE 802.15.4.

The **frequency synthesizer (FS)** generates the carrier wave for the RF signal.

The **command strobe processor (CSP)** processes all commands issued by the CPU. It also has a short program memory of 24 bytes, making it possible to automate CSMA-CA algorithms.

The **radio RAM** holds a FIFO for transmit data (TXFIFO) and a FIFO for receive data (RXFIFO). Both FIFOs are 128 bytes long. In addition, the RAM holds parameters for frame filtering and source matching, and for which 128 bytes are reserved.

Conform Regulation

- ETSI EN 300 328 and EN 300 440 (Europe)
- FCC CFR47 Part 15 (US)
- ARIB STD-T-66 (Japan)