DACOM West

ubec

US2400 Low Power 2.4GHz Transceiver

The US2400 integrates a 2.4 GHz RF transceiver with an IEEE 802.15.4-2006 compliant Baseband/MAC block within a single chip.

The US2400 can be controlled by a microprocessor for low-data-rate applications such as home-, industrial-automation, consumer electronics, PC peripheral …etc. For medium-data-rate applications like wireless voice and image transmission, the US2400 provides 1M/2M bps turbo mode.

The RF block of the US2400 integrates receiver, transmitter, VCO and PLL. The Baseband/MAC block provides the hardware architecture for both IEEE 802.15.4 compliant MAC and PHY layers. It mainly consists of TX/RX control, CSMA-CA controller, 'Superframe' constructor, security engine and digital signal processing module.

It uses advanced architecture to minimize the external component count and the power consumption.

Features

RF/Analog

- ISM band 2.405 ~ 2.480 GHz operation
- IEEE 802.15.4-2006 specification compliant
- Single End RF input/output
- RF sensitivity: -94 dBm @ 250kbps
- Maximum RF input level: 3dBm
- High receiver and RSSI dynamic range
- RSSI range: 44dB @ 250kbps
- RF output power: 1 dBm typical
- RF output power control range: 40dB
- 1M/2M bps turbo mode supported
- Supply voltage: 2.4 to 3.6V

- Current consumption in RX Mode: 20.4mA
- Current consumption in TX Mode: 25.5mA
- Idle Mode: 6mA/Halt mode: 1.8mA
- Standby mode: 5.1µA/Deep sleep mode: 4µA
- Power down mode: 0.1µA
- 32 MHz reference clock output
- Digital VCO and filter calibration
- Integrated RSSI ADC and I/Q DACs
- Few external component count
- Small 24-pin leadless LGA 6x6 mm² package
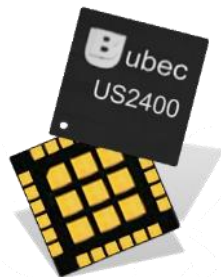
MAC/Baseband

- IEEE 802.15.4-2006 specification compliant
- Hardware CSMA-CA mechanism, automatic ACK response and FCS check
- Programmable "Superframe" construction
- Functionally independent TX FIFOs, including beacon FIFO, transmit FIFO and GTS FIFOs

- Dual RX FIFOs
- Hardware security engine (AES-128)
- Various power saving modes
- Support all CCA modes and RSSI/LQI
- Simple 4-wire SPI interface

U-Force.D / U-Power500.D 2.4GHz Transceiver Module

The U-Force and U-Power modules are IEEE 802.15.4 compliant solutions that satisfy the requirements of low-cost, low-power wireless sensor networks. Their small form factor saves RF tuning work and valuable board space.

The modules operate within the ISM 2.4 to 2.5 GHz frequency band. They consist of UBEC's UZ2400.D chip and components such as crystal, inductors and capacitors, and for the U-Power module the RF-Frontend IC UP2268.

The transceiver module within the UZ2400.D chip features a maximum of 5 MHz serial interface SPI bus for control and data transfer. It is a SPI interface slave device. The SPI interface consists of 4-wired bus: SCLK, SI, SO, and SEN.

The additional UP2268 in the U-Power module can be used in both weak and strong signal environments while maintaining the very low current consumption and a high 1 dB compression point (P1dB). Also, the UP2268 has independent control pins for transmit/receive (TX/RX) mode selection.

Additionally, it provides access to various storage units: MAC/BB/RF control/status registers, TXFIFOs, RXFIFOs and security key table.

Features

- ISM band 2.405 ~ 2.480 GHz operation
- IEEE 802.15.4-2006 specification and ZigBee compliant
- EN 300 328 V1.8.1 specification compliant
- 1.8V to 3.6V Operation for U-Force,
  3.0 to 3.6V for U-Power500
- Sleep Current: 4µA
- Communication range :
  typical 100m/500m (Environment dependent)
- PCB Antenna
- External 50W antenna possible
  (ground-Signal-ground design)
- Receiver sensitivity: -95dBm / 101dBm
- Data rate: 250kbps/1Mbps/2Mbps
- TX Power: 0dBm for U-Force.D Module
- TX Power: 11dBm for U-Power 500.D Module
- Tx Current consumption:
  DCDC OFF 23.2mA / 50mA, typical (3.3V operation)
  DCDC ON 17.5mA, typical (2.4V operation)
- Rx Current consumption:
  DCDC OFF 20.4mA / 29mA, typical (3.3V operation)
  DCDC ON 16.2mA, typical (2.4V operation)
- SPI interface

U-Force.D Module

- Board Size: 32mm x 14mm²

U-Power500.D Module

- Board Size: 48.3mm x 14mm²