

BOOST™ Radio

The BOOST™ Radio is a RF transceiver design for Bluetooth® applications. It covers the BT 2.0/2.1 specifications including EDR (Enhanced Data Rates) with GFSK, QPSK and 8-DPSK modulations. RF and Modem are included in the design. When combined with the BOOST™ Core (Bluetooth baseband), they form a complete Bluetooth solution. The BOOST RF uses a digital interface: bits interface for the data and a SPI interface for the control.

Product Features

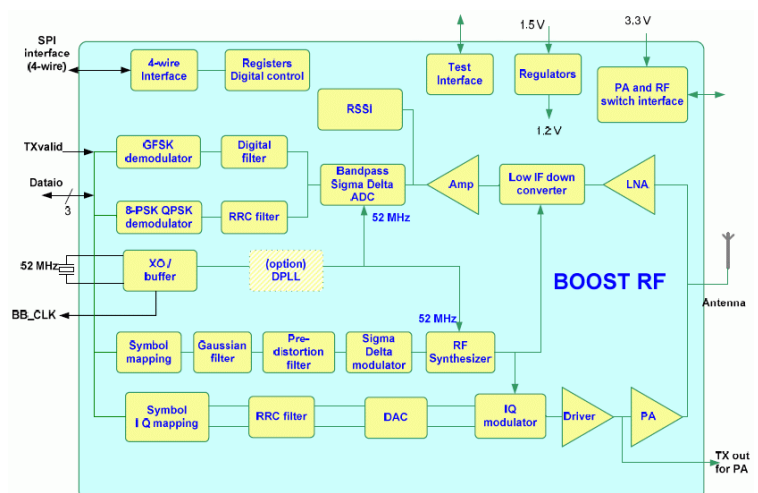
- Compliant to BT 2.0/2.1+EDR
- 2.4 GHz to 2.5 GHz band
- Portable devices: several low power modes implemented
- Single supply voltage: 1.5 V with internal 1.2 V regulators
- TSMC 90nm RFCMOS process
- Can be put in a 36-pins MLF, QFN or other CSP packages when used in a stand alone BT RF chip
- Digital Interface: bits interface
- Lowest power consumption, respecting GFSK legacy
- Direct RFPLL modulation for GFSK
- High Dynamic range Sigma-delta Receive ADC
- Designed for easy integration into ASIC or ASSP
- Ideal for mobile phone applications due to superior out of band blocking immunity and low noise, low spurious emissions
- Low IF Rx architecture (1 MHz), Zero IF transmit chain
- Programmable transmit power level up to 4 dBm at antenna
- Wide temperature range from -20 °C to +85 °C
- Efficient production test mode
- Digital interface to baseband
- Merged TX and RX
- Support of external PA for class 1 radio
- Rx sensitivity < -87 dBm
- Flexible power management
- No external AGC required
- No external IF filters
- Fully differential design

General Description

The BOOST Radio is a highly integrated low power Bluetooth CMOS radio that is compliant with Bluetooth specification v2.0/2.1 + EDR.

Implemented in a standard 90nm RFCMOS process technology, the BOOST Radio is a perfect low cost solution for standard Bluetooth products as well as for the integration into complex system ASICs. Its advanced low IF radio architecture allows filters to be integrated on the die. Therefore no expensive external components like inductors or SAW filters are needed.

The BOOST Radio has a digital interface to the baseband. A control interface to the baseband gives access to control registers like transmit power level and receive signal strength indicator (RSSI). Internal calibration algorithms eliminate the need for external tuning during the production process.



Integration into an ASIC

The BOOST Radio has been designed for integration into an ASIC. In conjunction with a suitable Bluetooth baseband processor (eg. the BOOST Core from Wipro-NewLogic) and a microprocessor (eg. ARM, ARC or similar) this enables the design and implementation of a true single chip CMOS Bluetooth system. The automatic AGC makes the control of the RF transparent for the baseband.

The BOOST Core and BOOST Radio are supported by a user-programmable software protocol stack enabling designers to implement fully operational Bluetooth wireless systems in the shortest possible time.

Target Process Technology

The BOOST Radio is designed to be largely process independent. The target technology should be a single polysilicon 90nm with very high fT transistors specified for operation at 1.2 V. Wipro-NewLogic recommends TSMC's 90nm RFCMOS process technology. For use with other process technologies, please consult Wipro-NewLogic.

Testability

The BOOST Radio core has been designed with testability in mind. Scan methodologies permit functional verification of the radio modem without the need for expensive test equipment. Sufficient test structures have been implemented to test analog circuitry.

Validation

The BOOST Radio has been validated using TSMC's 90nm RFCMOS process. Test chips have been fabricated enabling a comprehensive characterization of the building blocks, as well as the radio core as a whole. It is possible to evaluate a complete BOOST™ Bluetooth system (baseband, radio and software) using suitable development board provided by Wipro-NewLogic.

Parametric Specification

Symbol	Description	Value
Vcc	Single supply voltage	Min 1.4 V, Max 2.0 V
Ic_tx	Supply current continuous Tx mode	63 mW (1.5 V, +4 dBm at antenna)
Ic_rx	Supply current continuous Rx mode	35 mW (1.5V)
Ta	Temperature range	-20 °C to 85 °C
Ic_pwd	Current in power down mode	Less than 10 uA
Fout	Output RF frequency band	2.4 GHz – 2.5 GHz
Fclkin	System clock frequency	52 MHz
TxPower	Transmit power at antenna	-32 – +4 dBm (GFSK), -35 - +1 dBm (EDR)
Sensitivity	Receiver sensitivity	-85 dBm GFSK, 0.1% BER; -88 dBm QPSK, 0.01% BER; -83 dBm 8-DPSK, 0.01% BER

For more details about our products and services, email us at semi.ip@wipro.com or visit us at www.wipro-newlogic.com.