



BOOST Radio™

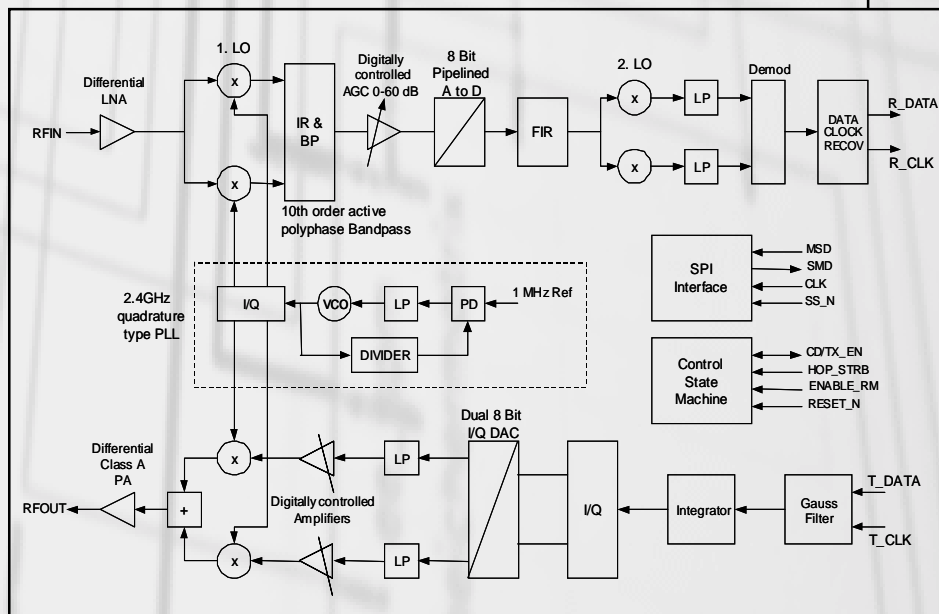
A CMOS Bluetooth™ radio core for the integration into Bluetooth standard ICs and ASICs. Complemented by BOOST Core™ and BOOST Software™, to implement a complete Bluetooth wireless technology system.

Product Features

- Bluetooth radio core compliant with Bluetooth specification v1.1
- Integrated in standard CMOS technology
- 0.18µm CMOS reference design
- Designed for easy integration into ASIC or ASSP
- Ideal for mobile phone applications due to superior out of band blocking immunity
- No external tuning required
- No external IF filters
- Efficient production test mode
- Rx sensitivity < -80dBm
- Digital interface to baseband
- Programmable transmit power level up to 4dBm at antenna
- Support of Rx/Tx switch
- Support of external PA for class 1 radio
- Support of clock frequencies from 1 to 32MHz
- Wide temperature range from -20°C to +85°C
- 1.8V single supply voltage
- Flexible power management
- Low power consumption
- Low IF architecture (1.5MHz)

General Description

The BOOST Radio is a highly integrated low power Bluetooth CMOS radio that is compliant with Bluetooth specification v1.1. Implemented in a standard 0.18µm CMOS 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, Blue RF compliant, interface to the baseband. An SPI 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 a Bluetooth 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 NewLogic) and a microcontroller (eg. ARM, ARC or similar) this enables the design and implementation of a true single chip CMOS Bluetooth system. 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 0.18µm with very high fT transistors specified for operation at 1.8V. NewLogic recommends TSMC's 0.18µm CMOS process technology with inductor option. For use with other process technologies, please consult NewLogic.

Parametric Specification

| Symbol | Description | Min | Typ | Max | Units |
|-------------|----------------------------------|-----|-----|-----|-------|
| Vcc | Single supply voltage | 1.6 | 1.8 | 2.0 | V |
| Ic_tx | Supply current Tx mode | | 40 | | mA |
| Ic_rx | Supply current Rx mode | | 38 | | mA |
| Ta | Temperature range | -20 | | 85 | °C |
| Ic_pwd | Current in power down mode | | 10 | | µA |
| fout | Output RF frequency band | 2.4 | | 2.5 | GHz |
| fclk | System clock frequency | 1 | | 32 | MHz |
| TxPower | Transmit power at antenna | 0 | | 4 | dBm |
| Sensitivity | Receiver sensitivity (BER <0.1%) | | -80 | -70 | dBm |
| P_tx | Total power consumption Tx mode | | 72 | | mW |
| P_rx | Total power consumption Rx mode | | 68 | | mW |

Testability

The BOOST Radio core has been designed with testability in mind. Built-in-self-test (BIST) and scan methodologies permit functional verification without the need for expensive test equipment.

Validation

The BOOST Radio has been validated using TSMC's 0.18µm CMOS 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 a suitable development board. More details of this can be found on NewLogic's website (www.newlogic.com).

About NewLogic

NewLogic is an independently owned and operated company based in Lustenau, Austria. Founded in 1997, NewLogic provides System-On-Chip (SoC) design services and silicon IP development for leading semiconductor and systems companies. NewLogic's

comprehensive IP portfolio includes embedded non-volatile memory, DSP, mixed signal and RF cores for the communications, automotive and consumer electronics markets.

