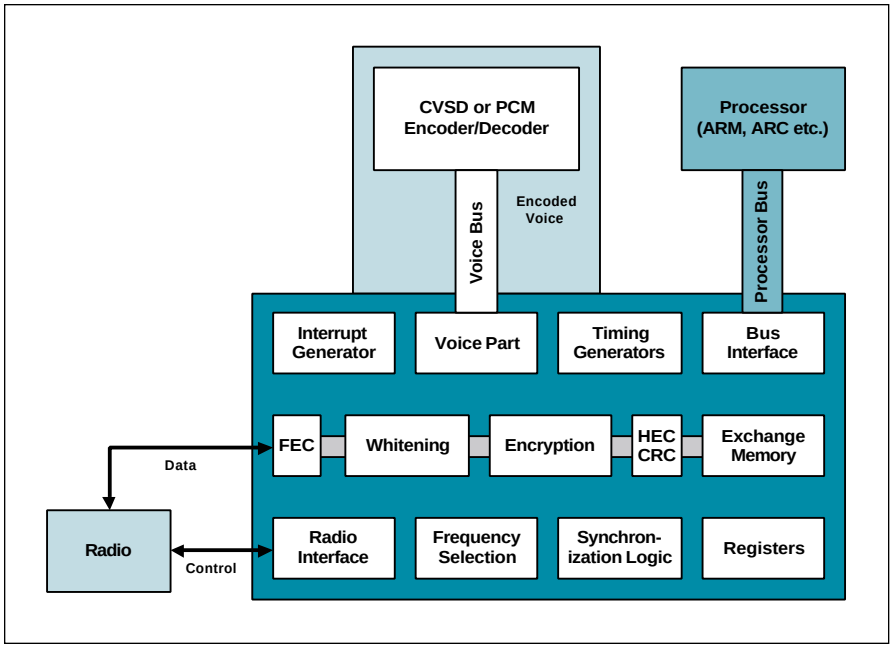
BOOST Core
Bluetooth Baseband Processor Core

Inventra Soft Core (RTL IP)

D A T A S H E E T



BOOST Core Application

Overview

The BOOST Core™ from NewLogic is a Bluetooth™ Baseband processor core for integration into Bluetooth standard ICs and ASICs. It is complemented by BOOST Software,™ which implements a Bluetooth protocol stack. This is also available from the Mentor Graphics Inventra Soft Core Library.

The BOOST Core offers a range of features including low gate count, low power consumption and low operating frequency. It can be interfaced to a range of different microprocessors (including ARM and ARC), and to a variety of different radio chips. It also offers a proprietary interface to a CVSD transcoder to allow continuous processing of a continuous voice stream without the need for processor intervention.

The core is available as VHDL RTL. Its size is approximately 48,000 gates.

Major Product Features:

- BQB-qualified to Bluetooth Specification v1.1
- Low-power consumption
- Low operating frequency, selectable between 12 and 16 MHz
- Low gate-count (30k gates)
- Supports a range of radio chips via a configurable interface
- Supports 0 dBm and 20 dBm radio modules
- Supports Bluetooth optional and mandatory paging modes
- Supports all packet types
  - — Control packets
  - — Voice packets
  - — Mixed voice-data packets
  - — Single-slot data packets
  - — Multiple-slot packets
- Flexible processor interface (ARM, ARC, etc)
- TDMA/TDD frame formatting and synchronization
- Hardware encryption
- Hopping frequency calculation (1600 and 3200 hops/s) for 79- and 23-frequency schemes
- Bluetooth clock and multiple offset management for Scatternet operation in master and slave devices

Deliverables:

- VHDL source code
- Synthesis script for VHDL compilation
- VHDL testbench
- Product Specification & User Guide

Related Products:

- BOOST Software™ Protocol Stack Interrupt

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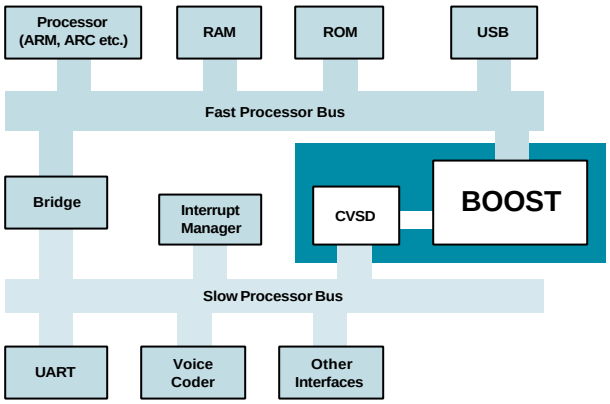
System Design

The BOOST Core has been designed for integration into an ASIC, as shown in the typical system diagram below.



Typical Bluetooth System

The RAM and ROM (or other non-volatile memory) are needed to host the BOOST Software (see below). Voice operation requires the CVSD transcoder (available as an option) and a voice coder. In data applications, the data stream may come from a UART, from a USB interface or from other proprietary interfaces.

The complete application can be integrated on-chip and used to generate a data stream for transfer via Bluetooth wireless technology.

Embedded Exchange Memory

The Exchange Memory comprises static RAM embedded inside the BOOST Core. It contains control structures and data buffers. Its size is typically somewhere between 1 and 8Kbyte but can be tailored to the application.

The processor and the core both access the Exchange Memory. A synchronization and prioritization mechanism is implemented to ensure clean handshaking between the hardware and the software, avoiding any real-time issues.

The Exchange Memory and registers are memory mapped on the core's address range (17-bit addressing range).

Interfacing to the BOOST Core

The BOOST Core is designed to interface to a fast processor bus. This bus ensures that data can be moved quickly between the processor and the Exchange Memory embedded into the core. The bus interface has been optimized for the ARM™ processor, but other processors (eg. ARC) are also supported.

For voice applications, the BOOST Core has a proprietary interface to the CVSD transcoder, so that a continuous voice stream can be processed without processor intervention. PCM format is also supported.

Radio components from various manufacturers can be attached to the BOOST Core. A dedicated radio interface is available for each supported radio, with the selection made at synthesis time so that only the necessary logic is implemented. The core interface is fully digital. Some additional A-to-D or D-to-A converters may be required to interface to specific RF modules. These can also be integrated directly on the baseband chip.

The BOOST Core can be used together with the BOOST Radio, NewLogic's Bluetooth CMOS radio core in order to implement a single chip Bluetooth solution.

Link with BOOST Software

The BOOST Software has been developed in conjunction with the BOOST Core in order to optimize the hardware-software interface and fully exploit the performance of the block. Interrupts are generated at times selected to synchronize the software processing with the operation of the core. A single interrupt is sent to the processor.

Validation

The BOOST Core and the BOOST Software have been validated on a development board. This board is available for ASIC prototyping and software development.

Reference Technology Gate Count: 48,000

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