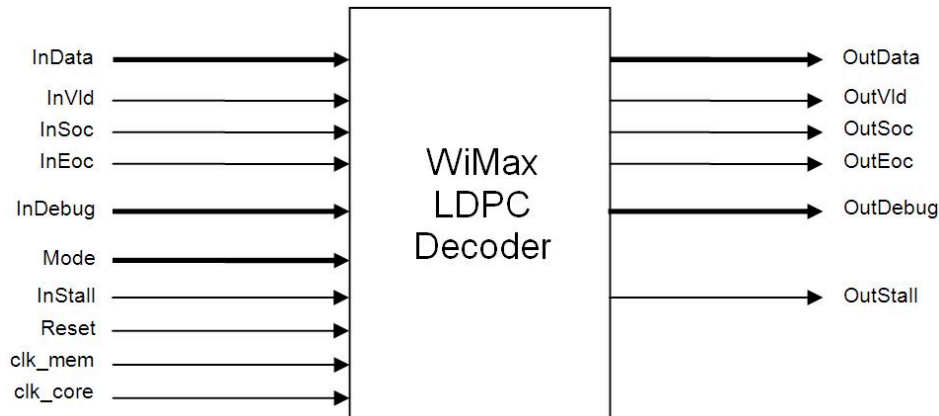


Product Brief

WiMax LDPC Decoder



IP Core Name

R3LDPC-WiMax Decoder for the IEEE 802.16e (WiMax) mobile wireless communications standard.

Features

- Soft decision Belief Propagation (BP) LDPC decoder targeted for the 802.16e standard.
- Meets the throughput requirements of the 802.16e standard.
- Provides decoder metrics to allow dynamic tuning for optimum power control.
- Implements upstream/downstream flow control and data buffering for easy integration.
- Verified on FPGA platform.

Deliverables

- Synthesizable RTL source code in VHDL.
- Comprehensive verification test bench and vectors.
- LDPC Visualizer development environment.
- Opal Kelly XEM3010 FPGA platform (Optional extra).

Overview

The R3LDPC-WiMax is an IP Core implemented in RTL that provides a 100% compliant LDPC decoder for the 802.16e standard. It achieves excellent decoder performance for reasonable decoder complexity by using a propriety version of the belief propagation algorithm.

The 802.16e standard specifies quasi-cyclic LDPC codes of 19 different lengths ranging from 576 bits to 2304 bits. Several code rates are also specified and they include 1/2, 2/3A, 2/3B, 3/4A, 3/4B, and 5/6. The decoder supports all rates as modes of operation.

The R3LDPC-WiMax core allows the user to optimize both power and area by providing a range of decoder parameters. These parameters can either be modified during the design process or even dynamically during normal operation of the decoder.

The design is targeted for use in ASICs and FPGAs.

Performance

The LDPC decoder core meets the throughput requirements of the standard.

LDPC Visualizer – FPGA Platform

The LDPC Visualizer is an FPGA based prototyping kit that implements the R3LDPC-WiMax in a Xilinx Spartan-3 along with noise generators, traffic generators, and a bit error rate counter. The platform also includes a GUI type interface to allow the user to experiment with the parameters of the R3LDPC-WiMax.

The platform is useful for exploring the configuration of the R3LDPC-WiMax and for obtaining low BER results in short periods of time. The entire platform has been optimized to run on an Opal Kelly XEM3010 board (www.opalkelly.com).

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