



LX4380 Product Brief

High-Performance, Synthesizable RISC Processor

The LX4380 is a complete licensable, MIPS R3000-class RISC processor subsystem. It is optimized for high performance in a portable ASIC design methodology. The LX4380 achieves high-performance with a unique 7-stage instruction execution pipeline. Only positive-edge clocking is used throughout the design. Entire register-to-register clock cycles are allocated to cache access to increase performance and ease ASIC integration.

The LX4380 executes the 32-bit MIPS-I* instruction set as well as Lexra extensions for improved embedded performance. The LX4380 incorporates selectable write-back, or write-through, cache controllers. Write-back was previously found only on 64-bit processors. The Block Move Controller (BMC) allows high-speed data or I/O transfer without interrupting the program.

Lexra's new MIPS R3000-style MMU (optional) comes with proven 3rd-party Linux support. Numerous additional customer configuration options ease ASIC integration. The LX4380 is supported worldwide by leading development tool vendors.

TARGET APPLICATIONS

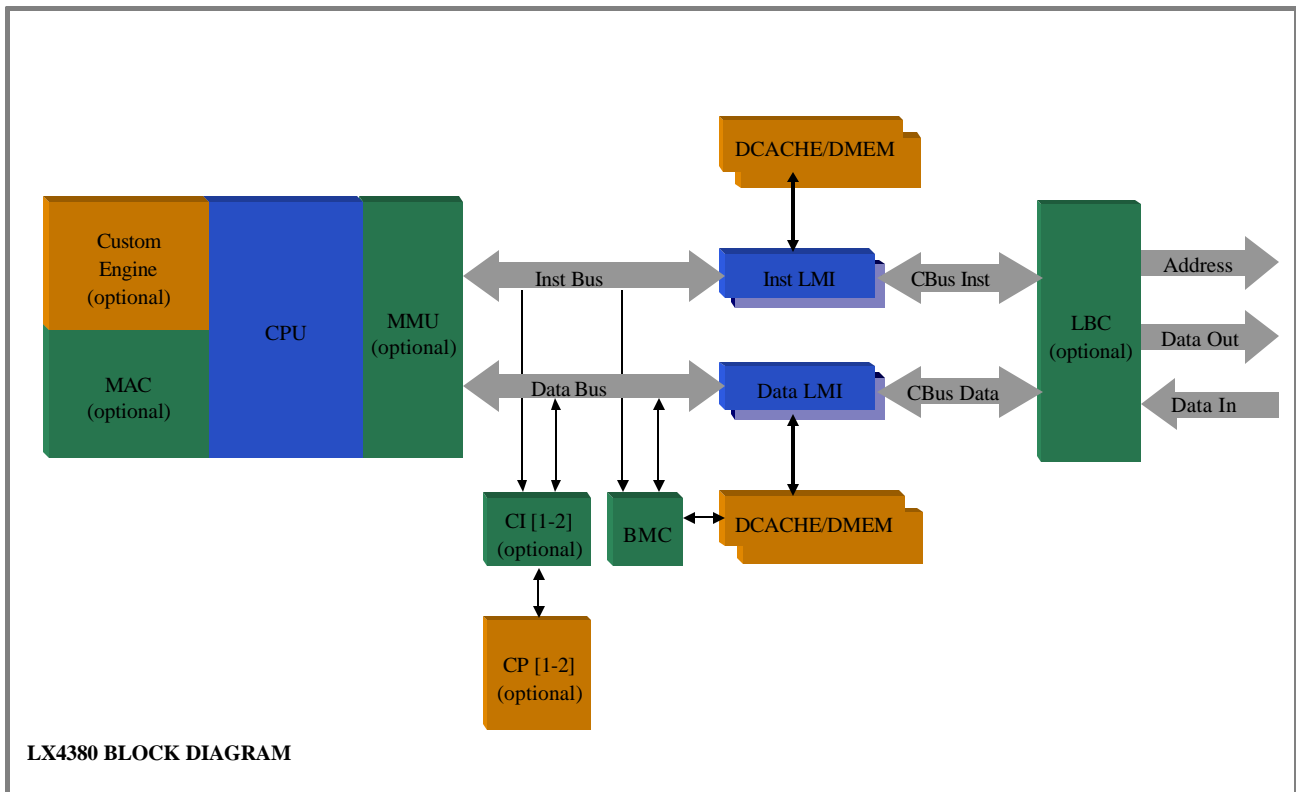
- Consumer electronics appliances
- DSL controllers
- Interactive digital TV devices
- Multi-protocol web servers
- Office automation

SPECIFICATIONS

RTL Model synthesized in a typical 0.15µm ASIC process:

- 300 MHz worst-case operating conditions
- XX MHz typical operating conditions
- 1.0 mm² (base configuration)
- Power dissipation: 44 mW (base configuration)
- Operating temperature: 125° C junction
- 1.2V core

Also available as a hard macro (SmoothCore™).



FEATURES – REQUIRED BLOCKS

- **High-Performance, Synthesizable CPU**
 - 7-Stage instruction execution pipeline
 - MIPS-I ISA
 - Lexra CPU extension:
 - Single-cycle 64-bit Load
 - Eight (8) prioritized, vectored interrupts
 - Conditional moves
 - Block Move Controller (BMC) – high-speed background DMA of data, I/O.
- **Local Memory Interface (LMI)**
 - 0 - 64 KByte ICache, 0 - 64 KByte Dcache
 - Direct-mapped or 2-set associative
 - Configurable line size (16-128 Byte)
 - Selectable write-through or write-back
 - Physically-indexed, physically-tagged
 - 0 – 256 KByte fixed IMEM, DMEM

FEATURES – OPTIONAL BLOCKS

- **Lexra Bus Controller (LBC)**
 - Separate unidirectional addr, data in, data out
 - 0 – 64 Byte write buffer
 - Variable size burst mode
 - Several clocking alternatives
- **Memory Management Unit**
 - MIPS R3000-style
 - Proven 3rd-party Linux support
 - 2-entry ITLB, DTLB; 16/32/64-entry JTLB
 - 4 KByte page size
- **MAC Unit**
 - Single-cycle 16x16b mult, mult-add, mult-sub
 - Two-cycle 32x32b mult, mult-add, mult-sub
- **Extended JTAG (EJTAG) 2.0.0 Debug**
 - Single-stepping
 - Instruction and data address breakpoints
 - Real-time PC trace
- **Custom Engine.** Customer can add application-specific ALU ops. 3-register operand or 2-register/immediate formats are available.
- **Coprocessors.** 1-2 Customer-designed Coprocessors can easily be attached to Lexra-supplied Coprocessor Interfaces (CI).

DEVELOPMENT TOOLS

The LX4380 is supported by the most popular development tools in the industry.

- Green Hills MULTI 2000 IDE.
- Embedded Performance, Inc. MAJIC emulator probes provide a high-speed hardware interface to the LX4380 using Extended JTAG on-chip debug interface and powerful industry standard debuggers.
- Lexra Instruction Set Simulator (ISS). Cycle-accurate model of the LX4380 to enable system-level software development and performance analysis.
- Lexra Hardware/Software Development Board. Enables PLD prototyping of systems incorporating the LX4380. The development board also facilitates early software development and debug.
- Available Operating Systems. Linux (Amirix Systems), NucleusPLUS (Accelerated Technology, Inc.), ThreadX (Express Logic), VxWorks (Wind River).
- Lexra GNU Tools. Standard GNU tools with Lexra extensions.

CONTACT INFORMATION

www.lexra.com

Corporate Headquarters

2055 Gateway Place Suite 150
San Jose, CA 95110
Tel: 408-573-1890
Fax: 408-573-1898

Copyright © 2001 Lexra, Inc.
ALL RIGHTS RESERVED

*MIPS, MIPS16, MIPS ABI, MIPSII, MIPSIV, MIPSV, MIPS32, R3000, R4000, and other MIPS common law marks are trademarks and/or registered trademarks of MIPS Technologies, Inc. Lexra, Inc. is not associated with MIPS Technologies, Inc. in any way. SmoothCore and Radiax are trademarks of Lexra, Inc. Unaligned loads and stores are not supported in hardware or software.