



Highlights

- Versatile DSP accelerator IP core;
- Convenient for multi- and many-core Systems-on-Chip;
- Excellent combination of small silicon footprint, computational power and low energy consumption;
- Efficient hardware and control;
- Predictable and deterministic behavior;
- Xentium Studio SDE with Eclipse IDE plug-in.

Target applications

- Processing sensor data in space
- On-board payload processing: FFT, FIR, DWT, CCSDS 121/122/123.

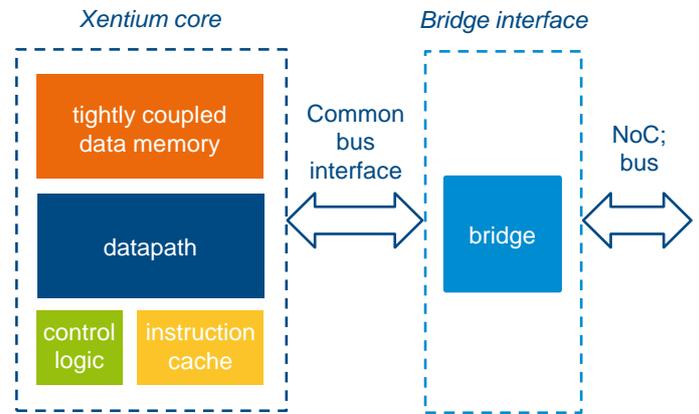
General description

The Xentium® is a high performance VLIW DSP core. It is a highly scalable IP building block, suited for large multi-core systems-on-chip (SoC). The Xentium can also be used as DSP accelerator in combination with a General Purpose Processor.

The Xentium combines high computational power with low energy consumption and a small silicon footprint. Advanced loop control mechanisms reduce code size and increase energy efficiency by switching off idle components during loop execution. Use of tightly coupled data memory further contributes to low energy consumption and high processing efficiency.

Key features

- 32-bit fixed point architecture supporting floating point emulation
- Versatile: building block for multi-core SoC as well as DSP accelerator core for general purpose processor
- Small silicon footprint
- High instruction-level parallelism with 10 execution slots
- 32/40-bit scalar and two 16-bit element vector operations
- Easy integration in NoC-based or bus-based SoC
- Energy efficient due to advanced control logic and loop techniques
- Customizable RTL soft core with configurable memory sizes
- Hardware debug support



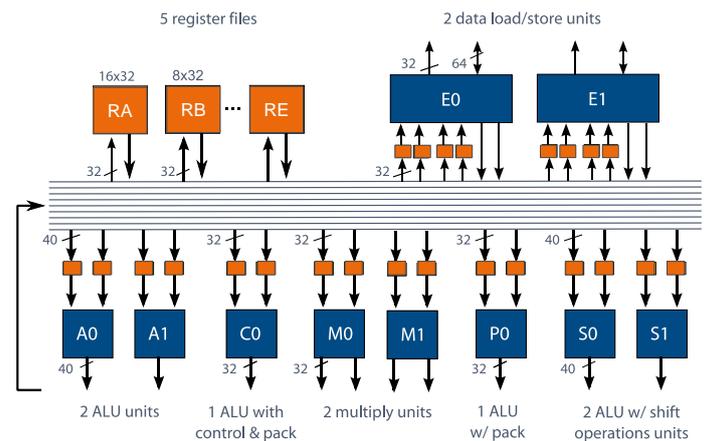
Xentium architecture

Xentium® architecture

The Xentium core consists of a datapath, control logic, an instruction cache and a tightly coupled data memory. Common bus interfaces which can be extended with e.g. external Network-on-Chip (NoC) interfaces facilitate integration into a (multi-core) System-on-Chip (SoC).

Performance benchmarks

FFT-256, radix-4	958 cycles
FFT-1024, radix-4	4680 cycles
32-tap complex FIR filter (256 samples)	4113 cycles



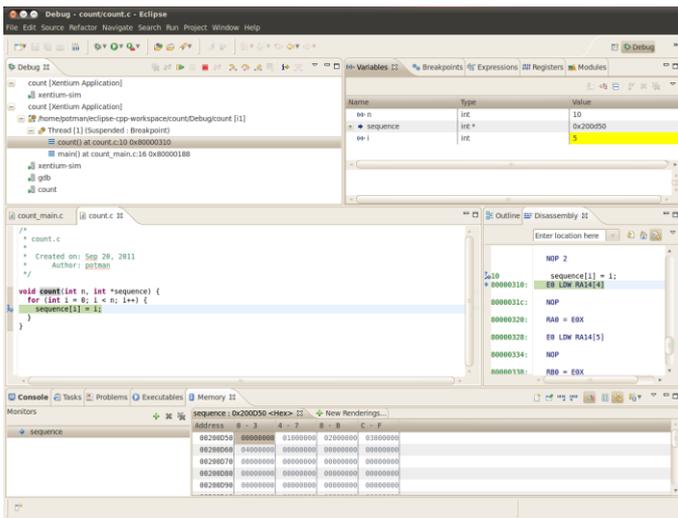
Xentium datapath



Xentium Studio Software Development Environment

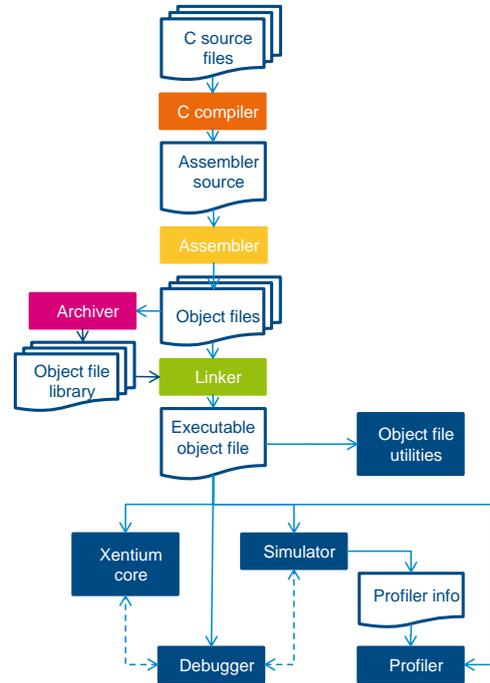
Recore's Xentium Studio Software Development Environment (SDE) is C-based and includes a tool chain consisting of a C compiler with standard C library, an assembler, a linker, a simulator, a debugger and a number of other utilities.

The tools in the tool chain are based on well-known tools such as the LLVM compiler infrastructure, the GNU binary utilities, and the GNU debugger, offering a familiar user interface to allow a quick start. A Xentium Eclipse plug-in integrates the Xentium tool chain in the Eclipse C/C++ IDE to provide a familiar graphical user interface for editing, building, simulating and debugging C programs for the Xentium.



Xentium tool chain

- The C compiler supports C99 and built-in functions for Xentium instructions. It comes together with a Newlib based standard C library;
- The assembler has clean and readable assembly syntax and a preprocessor with macro functionality to facilitate optional hand-programming;
- The Linker, which is based on the GNU linker, has support for linker scripts which allow developers to describe the memory layout of executables;
- The archiver lets developers create reusable code libraries.
- With the simulator, developers can test, time and trace execution of Xentium executables on their PC;



Xentium tool chain

- The debugger allows debugging a Xentium executable running in the Xentium simulator or on the Xentium hardware. The debugger is based on GDB, the GNU debugger, and therefore offers a familiar user interface.

Development support

To assist you in developing your own DSP applications, Xentium Studio SDE comes with the following:

- Xentium Tools for 32- and 64-bit Linux;
- Xentium DSP libraries with a range of common DSP functions such as various kinds of FIR filters and FFTs;
- User Guides explaining the Xentium architecture and instruction set, the tool chain and the use of the plug-in;
- Support and design services for e.g. DSP multi-core System-on-Chip design and Xentium application development.



Recore Systems BV
PO Box 77
7500 AB Enschede
The Netherlands

+31 53 4753 000
+31 53 4753 009
info@recoresystems.com