

CLEAR SPEED CSX700 PROCESSOR

Class leading robust performance at industry-leading performance per watt

The CSX700 is a many-core 64-bit floating point coprocessor with reliability, fault tolerance and adaptive power management features built in. It is optimized for high performance embedded floating point computing applications.

The CSX700 is the second generation of ClearSpeed's family of floating point accelerators. The CSX processors are based around ClearSpeed's patented multi-threaded array processor (MTAP) architecture. This architecture has been developed to solve the size, weight and power (SWAP) constraints frequently found in embedded applications.

By integrating processing, system interfaces and on-chip memory with ECC the CSX700 brings cost, reliability and performance advantages that solve leading edge, high performance embedded system requirements.

Designed for low power consumption, the CSX700 combines aggressive clock gating techniques, custom silicon design with a low operating frequency. Simple clock management enables maximum application performance within defined power and thermal envelopes.

The MTAP processor is a massively data parallel architecture with a high degree of replication for efficiency and reliability. Performance is achieved from the high level of internal parallelism. The architecture is suited to sophisticated signal and image processing in the time and frequency domains.

The CSX700 is supported by a professional software development kit based around an optimizing ANSI C compiler. This includes fully featured debug and profiling tools. In addition to the standard C libraries, a suite of optimized libraries that provide common functionality such as FFT, BLAS and LAPACK functions are available.

Why choose the ClearSpeed CSX700 processor?

- **Low power, energy efficient design:** < 9W (typical)
- **Integrated PCIe x16 (Gen 1 rev 1.1)**
- **High reliability RAS features:** ECC on all on-chip memories
- **Performance:** 96 GFLOPS/s floating point processor
- **Precision:** 64 & 32 bit floating point, IEEE 754 compatible
- **IBM 90nm process**
- **Robust, 3rd generation Eclipse based software development environment with integrated visual debugging and profiling**
- **Easy to program:** Software Development Kit supports ANSI C with parallel programming extensions

Visit www.clearspeed.com for the latest product information



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CSX700 Specifications

High performance

- 96 GFLOPS of double precision floating point (peak).
- 64 and 32 bit floating point, IEEE 754 compatible.
- Power dissipation (signal processing): <9W (typical)

Features

- ECC protection on all internal memories
- Two multithreaded parallel arrays, each with:
 - 96 processing elements, each with 6Kbytes ECC SRAM
 - Dual 64-bit FPU on every PE
 - 8 Kbyte instruction and 4Kbyte data caches
- 2x 128 Kbyte on-chip memory (SRAM)
- 2x integrated DDR2-533 memory controllers, scrubber and DMA; Enabling 8 GBytes of DDR2 ECC DRAM support
- A high speed 4 Gbytes/s full duplex FPGA compatible system interface (CCBR)
- Dedicated host and debug port (HDP)
- Integrated PCIe x16 (Gen 1 rev 1.1) with dual channel DMA, providing 8 Gbyte/s host to chip transfer.
- JTAG boundary scan (IEEE compliant)
- Core frequency: 250MHz (nominal)
- Signal count: 680 (including analog supplies)
- Package: 1429 ball; 1mm pitch; 40mm x 40mm thermally enhanced flip-chip package.

Application Development

- Development Kit available for Microsoft Windows, Red Hat® and SUSE™ Linux® operating systems on x86 platforms, for use with a ClearSpeed Advance e710 card.
 - C compiler with parallel programming extensions with standard C libraries
 - Instruction set and cycle accurate simulators
 - Open source device driver and user level runtime libraries to interface to processor
 - Optimized vector math and random number generator libraries
 - FFT library and BLAS functions
 - Industry standard GDB debugger
 - ClearSpeed Visual Profiler supports profiling of host, system and CSX700

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