A next-generation many-core processor with reliability, fault tolerance and adaptive power management features optimized for embedded and high performance computing applications

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The CSX700 Processor

- Includes dual MTAP cores:
  - 96 GFLOPS peak (32 & 64-bit)
  - 48 GMACS peak (16x16 → 32+64)
  - 10W max power consumption
  - 250MHz clock speed
  - 192 Processing Elements (2x96)
  - 8 spare PEs for resiliency
  - ECC on all internal memories
- On-die temperature sensors
- Active power management
- Dual integrated 64-bit DDR2 memory controllers with ECC
- Integrated PCI Express x16
- CCBR chip-to-chip bridge port
- IBM 90nm process
- 266 million transistors
- Shipping to customers since June 08
The ClearSpeed Advance™ e710, e720 and CATS-700

- 96 GFLOPS e710 & e720 fit standard 1U & HP blade servers
  - Low power consumption of 25W max, small, light, passively cooled
  - Designed for high reliability (MTBF)
  - All memory is error protected; no moving parts (e.g. fans) are required

- CATS-700 1U system
  - 1.152 TFLOPS 32- and 64-bit floating point
  - 96 GBytes/s memory bandwidth to 24 GB of ECC protected DDR2
  - 300W typical power consumption

- Easy to use Software Development Kit
  - ANSI C compiler, gdb-based debugger, advanced profiler
CSX700 FFT performance and e710 power consumption

1D FFT performance up to 20 GFLOPS, 2D FFT performance up to 16 GFLOPS
1D convolution performance up to 22 GFLOPS, ~3 GFLOPS/watt on FFTs
CSX700 and beyond

• The CSX700 is much more power efficient than cell and GPUs for embedded processing.
  – E.g. for single precision complex 1024x1024 2D FFT:
  – Cell (8 SPE): 38 GFLOPS 40W 0.95 GFLOP/watt
  – S870 (Tesla) GPU: 50 GFLOPS 170W 0.07 GFLOP/watt
  – x86 core: 3 GFLOPS 25W 0.12 GFLOP/watt
  – CSX700: 20 GFLOPS 7W 2.86 GFLOP/watt

• Next generation processor “Carnac” in design now
  – Focusing on 1- and 2D FFT performance
  – Design goal is 100 GFLOPS/watt sustained on 2D FFTs

• ClearSpeed Federal Systems launched to support defense programs