GE
Intelligent Platforms

AXISLib-PPC

DSP & Math Libraries for Power Architecture with Altivec Support

Features

- 600+ DSP and Vector Math Functions
- VSIPL API Core 1.0+
- RSPL API for maximum performance
- Generic C libraries
- Development and production library builds
- Many hand optimized functions
- Target Platforms:
  - Power e600 Altivec for VxWorks, LynxOS and Linux

AXISLIB-PPC from GE Intelligent Platforms is a family of high performance DSP and math libraries that deliver world class performance for Freescale e600 Altivec MPC7447A/7448 and MPC8640D dual core platforms.

Portability

The Vector Signal Image Processing (VSIPL) open standard application programing interface (API) facilitates code portability across multiple CPU generations and architectures to support technology refresh during the entire program life cycle.

Performance

GE's RSPL API gives the programmer more control with lower CPU overheads to meet very challenging performance objectives.

Benchmarks

GE can supply performance benchmarks for a suite of common DSP functions on the latest ITNEL, NVIDIA GPGPU and PowerPC platforms.

Reduced cost of ownership

AXISLIB gets the best performance out of the deployed system without the need to hand craft libraries for each processor architecture thereby reducing project work load, cost of ownership and shortening time to solution.

Flexibility & performance tuning

AXISLIB delivers more than 500 standard functions and our team of expert mathematicians and programmers can offer optimization services to meet the most demanding customer requirements.

AXIS Advanced Multiprocessor Integrated Software

AXISLIB DSP and Math libraries can be used on their own, or within GE's integrated multiprocessor application development framework that includes AXISFLOW interprocessor communication (IPC) middleware and AXISVIEW integrated GUI. These tools enable fast prototyping and application scaling across multiple CPUs, boards and system fabrics.

AXISView screen shot
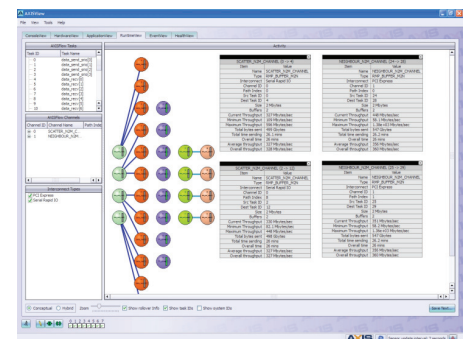
GE single board computers (SBCs) and multiprocessing boards leverage the latest high performance computing (HPC) architectures and switched fabrics onto rugged COTS form factors such as 3U & 6U OpenVPX. These platforms allow system integrators to move desk top and HPC applications into mission critical pay loads to meet expanded operational requirements for a range of intelligence, surveillance and reconnaissance (ISR) platforms.

Typical applications include radar, sonar, image processing, SIGINT, ELINT, EW and counter measures for deployed airborne, ground and naval platforms.
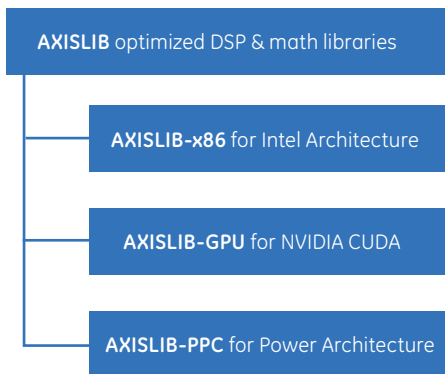
AXISLib-PPC – DSP & Math Libraries for Power Architecture with Altivec Support

GE Intelligent Platforms' rugged DSP230 multi-processor running AXISLib DSP routines offers a compelling Power Architecture solution to support expanded ISR mission capabilities across a wide range of SWaP sensitive applications.

AXIS Multicomputer
Open Architecture, COTS
Multiprocessor Solutions

AXISLIB optimized DSP & math libraries

AXISLIB-x86 for Intel Architecture

AXISLIB-GPU for NVIDIA CUDA

AXISLIB-PPC for Power Architecture

Features

Function Set	Description
Scalar	
Complex Scalar	40 functions for performing complex scalar math
Index Scalar	4 functions for indexing matrix elements
Random Number Generation	
Random Numbers	8 functions for generating random numbers, vectors and complex vectors
Vector and Elementwise Operations	
Elementary Mathematical	18 functions performing elementary vector math (sin, cos, tan, atan, exp, log, sqrt, etc.)
Unary Operations	35 functions for operating on a single vector or matrix
Binary Operations	57 functions for operating either two vectors or matrices or one vector and a scalar
Ternary Operations	24 functions for operations requiring three inputs
Logical Operations	8 functions for performing logical operations on vectors or matrices
Selection Operations	23 functions for selecting a subset of a vector or matrix
Bitwise and Boolean	12 functions for performing Bitwise and Boolean operations on vectors and matrices
Logical Operators	
Element Generation and Copy	37 functions for copying and generating vector elements
Manipulation Operations	18 functions for vector and matrix manipulation (e.g. scatter, gather and swap)
Vector Conversion and	
Rounding	18 functions
Signal Processing	
FFTs	43 functions for performing 1D and 2D FFTs (real-complex, complex-real, complex-complex in place and out-of-place)
Windowing	4 windowing functions (Blackman, Hanning, Kaiser, Chebyshev)
Filter	8 functions for FIR filtering
Convolution	3 functions convolutions (1D)
Correlation	3 functions correlations (1D)
Histogram	1 function histograming
Linear Algebra	
Matrix and Vector Operations	86 functions for performing linear algebra on vectors and matrices
SVD	3 functions for performing Singular Value Decomposition
Linear System Solvers	29 functions

Sample Function Times - 1K Vectors

Function	Description (All timings are for 1024 points)	Data in L1 Cache*
rad_ccfftip_split_f	Split complex to complex 1D in-place FFT	6.63 µs
rad_crfftop_split_f	Split complex to real 1D out-of-place FFT	5.06 µs
rad_cvmul_split_f	Split complex vector multiply	1.6 µs

*Results obtained on Freescale 8641D (single core) running @ 1.5 GHz and measured in µs

Ordering Information

AXISLIB-PPC-01M	Maintenance. Will call be one CD containing both Altivec optimized & generic C VSIPL and RSPL libraries.
AXISLIB-PPC-01R	Runtime license

GE Intelligent Platforms Contact Information

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Global regional phone numbers are listed by location on our web site at **www.ge-ip.com/contact**

www.ge-ip.com/axisdemo