GE
Intelligent Platforms

AXISLib-AVX

DSP & Math Libraries for Intel Processors with Advanced Vector Extensions (AVX)

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
- AVX optimized functions
- Target Platforms: Intel 32 & 64bit multi-threaded, multicore CPUs with AVX 256bit wide SIMD extensions for Windows™, Linux & VxWorks™

AXISLIB-AVX from GE Intelligent Platforms is a family of high performance DSP and math libraries that deliver world class performance for the latest Intel 2nd generation Core i7 multicore, multithreaded platforms with Advanced Vector Extensions (AVX).

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, Intel, 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 600 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 inter-processor communication (IPC) middleware and AXISVIEW integrated GUI. These tools enable fast prototyping and application scaling across multiple CPUs, boards and system fabrics.
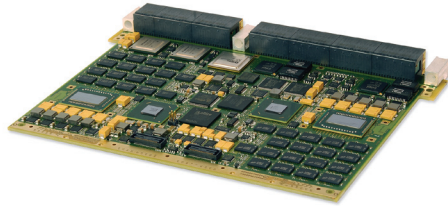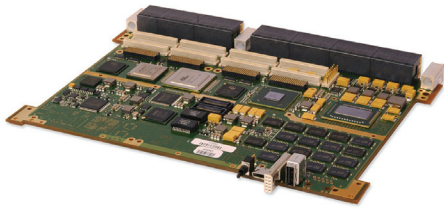
AXISView screen shot
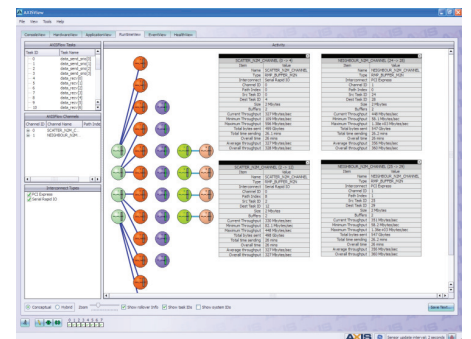
GE single board computers (SBCs) and multiprocessing boards leverage the latest high performance computing (HPC) architectures and switched fabrics onto rugged COTS form factors such as 3U & 6U OpenVPX. These platforms allow system integrators to move desk top and HPC applications into mission critical 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.

DSP & Math Libraries for Intel Processors with Advanced Vector Extensions (AVX)

Functionality

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	11 functions for generating random numbers, vectors and complex vectors

Vector and Elementwise Operations	
Elementary Mathematical	42 functions performing elementary vector math (sin, cos, tan, atan, exp, log, sqrt, etc.)
Unary Operations	48 functions for operating on a single vector or matrix
Binary Operations	60 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	20 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 Logical Operators	16 functions for performing Bitwise and Boolean operations on vectors and matrices
Element Generation and Copy	40 functions for copying and generating vector elements
Manipulation Operations	28 functions for vector and matrix manipulation (e.g. scatter, gather and swap)

Signal Processing	
FFTs	42 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	8 functions convolutions (1D & 2D)
Correlation	8 functions correlations (1D & 2D)
Histogram	1 function histograming

Linear Algebra	
Matrix and Vector Operations	75 functions for performing linear algebra on vectors and matrices
Linear System Solvers	45 functions

**Note: List does not account for all data type varieties of functions. Standard VSIPL management functions are not included in this listing.

SBC624 and DSP280 are the first in a new generation of rugged, high performance embedded computing (HPEC) OpenVPX solutions that benefit from the new AXISLIB-AVX libraries bringing best-in-class performance to SWaP sensitive defense and aerospace applications for a range if ISR missions.

Ordering Information

AXISLIB-AXV-01M	Maintenance Agreement. Includes the right to use license and 1 x runtime license. Annually renewable.
AXISLIB-AXV-01R	Runtime license

Performance Bench Marks:
Sample Function Times (single thread unless stated) * –

Function	Description	Time in Microseconds
vsip_ccfftip_f	1K complex-complex in-place FFT	2.7
vsip_ccfftip_f	128K complex-complex in-place FFT	773 (4-threads)
vsip_mtrans_f	256*256 real matrix transpose	32.3

Results obtained on a Intel 2nd Generation Core i7 @ 2.16 GHz & measured in µs. Data in cache where possible.

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.defense.ge-ip.com