

AXISLib-AVX 2.0

DSP & Math libraries for Intel 4th gen Core-i7 Processors with AVX2

Features

- **64bit Operating system support:**
 - RHEL compatible Linux
 - Wind River Systems VxWorks
 - Windows 7
- **Industry standard APIs:**
 - 600+ library functions
 - VSIP API Core 1.0 + profile
 - RSPL – Performance API
 - Generic C libraries
 - Multicore support.
 - Error checking, debugging & performance library builds
- **Performance function sets:**
 - Scalar operations
 - Random number generators
 - Vector & matrix operations
 - Signal processing
 - Linear algebra
 - AVX2 support
- **Portable for latest technology:**
 - Standard API across multiple processor generations.
- **AXISLIB multi-platform support:**
 - AXISLIB-AVX for Intel® Core™ i7
 - AXISLIB-X86 for 1st gen Core2Duo
 - AXISLIB-GPU for NVIDIA GPUs
 - AXISLIB-PPC for Freescale Power Architecture

AXISLIB-AVX from GE Intelligent Platforms provides a suite of more than 600 performance optimized digital signal processing (DSP) and math function libraries that deliver world class performance for size, weight and power (SWaP) constrained platforms.

Upgrade to Intel Core-i7 & AVX2

Targeted at Intel Core-i7 with Advanced Vector Extensions (AVX), AXISLIB-AVX extends support beyond the AVX1 256bit floating point unit introduced on 2nd and 3d generation SKUs, to the latest 4th gen Intel "Haswell" AVX2 enabled platforms that add fused multiply add (FMA) and 256bit wide integer instructions.

Multi- threaded libraries

AXISLIB libraries include support for single or multi-threaded operation so you can get the most out of Intel's hyper-threaded multi-core platform.

64bit Linux, VxWorks and Windows support

AXISLIB-AVX is tested on Red Hat Enterprise Linux (RHEL) as well as Wind River Systems VxWorks 6.9.2 and Windows 7. RHEL compatible and real-time Linux distributions may also be used.

AXIS Integrated Software

AXISLIB DSP and Math libraries can be used on their own, or within the AXIS Advanced Multiprocessor Integrated Software framework that includes AXISFlow interprocessor communication (IPC) middleware and the AXISView integrated graphical user interface (GUI).

These tools enable fast prototyping and application scaling across multiple processor cores, processor nodes, boards and data or control plane fabrics including Ethernet, Infiniband and PCIe.

AXIS Quick start demos

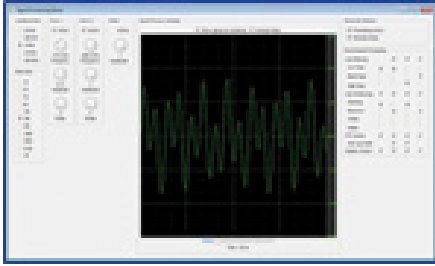
GE demos provide intuitive DSP and image processing examples that can be used to accelerate application development on high performance embedded computing (HPEC) Open System Architecture (OSA) platforms such as our latest COTS 3U and 6U Open-VPX solution sets.

Performance Tuning for best SWaP

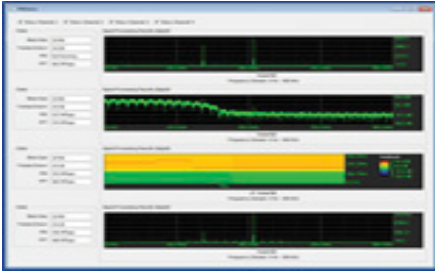
AXIS software modules give you the power to optimize performance to meet expanded operational needs of the most demanding signal and image processing applications typical of many of today's deployed intelligence, surveillance and reconnaissance (ISR) platforms.



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Signal Processing Demo



3U & 6U OpenVPX Platforms



Functionality

Function Set

Scalar

Complex Scalar
Index Scalar

Description

40 functions for performing complex scalar math
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
Unary Operations
Binary Operations
Ternary Operations
Logical Operations
Selection Operations
Bitwise and Boolean
Logical Operators
Element Generation and Copy
Manipulation Operations
Sort operations

42 functions performing elementary vector math (sin, cos, tan, atan, exp, log, sqrt, etc.)
48 functions for operating on a single vector or matrix
60 functions for operating either two vectors or matrices or one vector and a scalar
24 functions for operations requiring three inputs
20 functions for performing logical operations on vectors or matrices
23 functions for selecting a subset of a vector or matrix

16 functions for performing Bitwise and Boolean operations on vectors and matrices
40 functions for copying and generating vector elements
28 functions for vector and matrix manipulation (e.g. scatter, gather and swap)
2 functions for vector sorting

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 for convolutions (1D & 2D)

Correlation

8 functions for correlations (1D & 2D)

Histogram

1 function for histogramming

Linear Algebra

Matrix and Vector Operations
Linear System Solvers

75 functions for performing linear algebra on vectors and matrices
45 functions

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

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 (split)	1.65
vsip_mtrans_f	256*256 real matrix transpose	15.04
vsip_cmprod_f	64*64 complex matrix product (split)	77.2
vsip_vsin_f	8K vector sine	4.47

Results obtained on a Haswell architecture Intel i7 @ 2.4 GHz and measured in μ s. 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

defense.ge-ip.com

