

# Floating Point Math.h Functions Accelerated 2 – 10X on FPGA Hardware, with Impulse C High Level Synthesis Tools

Sin, cosine, log and other floating point functions accelerated in FPGA hardware

**Kirkland, WA – 26 February, 2010** – Impulse Accelerated Technologies today announced a new FPGA hardware library supporting C-language math.h functions.

Unlike math.h functions that run “native” in embedded processors, the Impulse library is implemented directly in FPGA hardware, and supports refactoring into multiple, pipelined parallel processes. When used in this way, the math.h functions operate 2 – 10X faster than on embedded processors. And because they are callable from Impulse C, they are more accessible to software developers and others less familiar with FPGA hardware, saving weeks of HDL hand coding and iteration time.

The new math.h library adds more scientific, algorithmic and engineering functions to the existing Impulse C floating point support. The library provides access to single- and double-precision functions such as sin, cosine, log, tan, exp, pow, sqrt, etc. Library components are provided with standard C-language function prototypes, allowing them to be easily invoked, using the same function calling methods C programmers are familiar with. These C-callable functions represent optimized math elements that are instantiated, through the use of synthesis and place-and-route tools, in the target FPGA. The Impulse C math.h Library is royalty free.

“Running floating point functions directly in hardware helps accelerate the performance of embedded applications”, said Michael Kreeger of Kreeger Research. “By providing common math.h functions, Impulse increases the accessibility of Xilinx Virtex and Spartan devices to the wider software audience.”

Impulse C enables software developers to create modules for field programmable gate arrays. These modules may use FPGA hardware, FPGA coprocessors, or the resources of entire FPGA based coprocessing development boards. The Impulse tool suite creates the necessary hardware interconnections from the developer’s ANSI C code, and preserves the full ANSI compatibility of the code. Within the Impulse tools, software developers are able to refactor C code for massive parallelizing to exploit the available FPGA resources. Impulse products work with GCC/GDB or Visual Studio™ and produces acceleration of 10X to 300X. Development times are typically halved and iteration time reduced by 80%.

“The Impulse user group has grown past 1,400. About 1/3 appear to be software developers exploring hardware acceleration” commented Brian Durwood, co-founder of Impulse. He elaborated, “For them, automating floating point library acceleration lowers a hurdle for software-to-hardware compilation. Accordingly we are seeing research labs at universities creating reconfigurable computer arrays that challenge the old line supercomputers, in a fraction of the footprint and which reach a wider user group.”

## **About Impulse**

Impulse Accelerated Technologies provides C-to-FPGA tools, training and custom hardware/software solutions for automotive, defense, industrial and financial customers worldwide. Impulse tools are used for vision systems, face and object recognition, video feed analysis for national security and automotive applications. Impulse customers develop FPGA-based products as well as targeting ASIC deployments. Impulse products are in use at over half of automotive suppliers and eight of the world’s top ten defense contractors. For more information visit [www.ImpulseC.com](http://www.ImpulseC.com)

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