

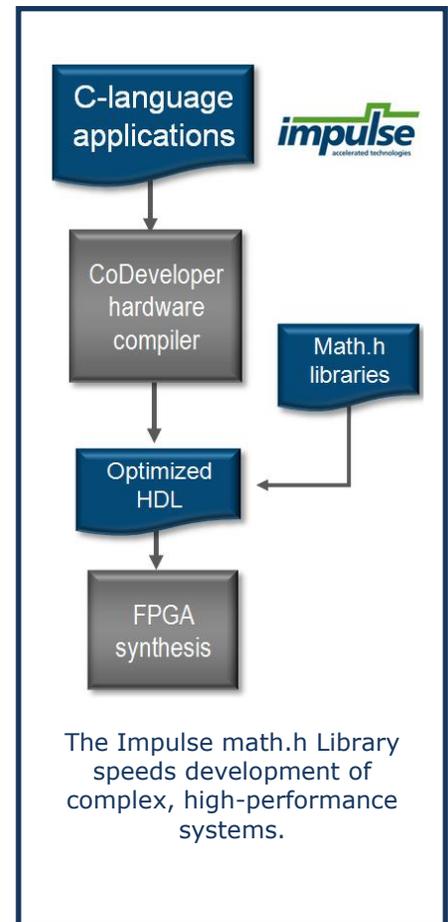
# Impulse C™ FPGA math.h Library for FPGAs

Library adds commonly used C functions for integer and floating point math

The Impulse C™ math.h Library accelerates your FPGA based algorithm development and extends the math operations provided in Impulse C. Library components are provided with standard C-language function prototypes, allowing them to be easily invoked from C, 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 math.h Library implements standard C math.h functions. The Library is provided as a set of HDL files and related configuration files implementing common mathematical operations. Most of these functions involve the use of floating point numbers, either single or double-precision.

The Impulse C math.h Library is royalty free; all of the included elements can be incorporated into your designs with no restrictions or deployment fees.



## Key product benefits

- Provides parallelized, optimized versions of math.h elements.
- Integrates seamlessly into Impulse CoDeveloper Version 3.
- Supports single precision (32 bit) and double precision (64 bit) floating point numbers.
- Implemented using unbiased mantissa rounding.
- Fully pipelined to support high throughput rates.
- All functions process data at a rate of one input per clock.
- Enables software and hardware engineers to be quickly productive when developing math algorithms in FPGAs.
- Improve performance by leveraging pre-optimized functions.
- Reduces risk by reusing known-good code.
- Retains compatibility with ANSI C for software-level debugging.
- Generated hardware is in standard HDL formats, ready for synthesis to popular FPGA devices.
- Offered with a one-time license fee, and no deployment royalties.

## Design Flow

1. Combine math.h library function calls C-language to create complex systems.
2. Integrate pre-optimized library blocks from FPGA manufacturer libraries.
3. Analyze, refactor, compile and iterate to optimize FPGA performance.
4. Verify C code functionally in a desktop environment such as Visual Studio, Eclipse, and GCC-based tools.
5. Export synthesizable VHDL or Verilog to FPGA synthesis and platform tools.

## About Impulse C™ and CoDeveloper™

Impulse C allows you accelerate your embedded and high performance computing algorithms by taking advantage of FPGA parallelism, without writing low-level HDL. Impulse C is industry-proven for applications in defense, aerospace, medical, industrial and other performance-critical applications. Impulse products and services allow more rapid development of high-performance systems using familiar software programming methods.

Impulse CoDeveloper includes the Impulse C software-to-hardware compiler, interactive parallel optimizer, and Platform Support Packages for a wide range of FPGA-based systems. Impulse tools are compatible with all popular FPGA platforms and tools.

### Hardware IP blocks from C code

Support for module generation allows hardware IP blocks to be generated from C-language, using named ports and streaming API functions to integrate these blocks with the overall design. Impulse C IP blocks can be easily mixed with Verilog or VHDL, or with IP created using FPGA manufacturers tools. For video applications, the Impulse C API functions can be used to combine multiple streaming C-language processes to create highly pipelined, high-throughput systems.

### Rapid prototyping

By working at a higher level of abstraction, you can more quickly generate working prototypes for system testing. This allows you to try dramatically different algorithmic approaches with only minimal changes to the C source code. Experiments that can take hours to accomplish in HDL can take just minutes using Impulse C.

### Tools, training and design services

Impulse expert staff members are here to help, providing product support, design consultation and custom development. Impulse tools are intuitive and fit into existing design flows. Contact us to discuss your FPGA processing requirements.

## Math.h supported operators:

- ✓ sin
- ✓ cos
- ✓ tan
- ✓ exp
- ✓ log
- ✓ log10
- ✓ pow
- ✓ asin
- ✓ acos
- ✓ atan
- ✓ sqrt
- ✓ fabs

## Contact us for details:

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