

## GOFAST<sup>®</sup> for Power PC C Compilers

### Features

- ◆ Fast
- ◆ Reentrant
- ◆ ROMable
- ◆ Conforms to IEEE 754
- ◆ Includes single and double precision
- ◆ “Link and Go” compiler support
- ◆ Complete source code provided
- ◆ Includes test programs and makefiles

### Compiler Support

GOFAST libraries are designed for “link and go” operation with each compiler. These libraries provide the user with a significant speed advantage when no floating point coprocessor hardware is available. This is of particular significance in real-time embedded systems.

GOFAST for Power PC includes drop-in libraries for “link and go” seamless operation with Metaware, Diab Data, IBM, and Motorola Power PC C compilers.

The GOFAST routines directly replace the compiler’s floating point runtime library routines. Two types of interfaces are provided. The first is an emulator interface, which uses a processor interrupt to pick up the floating-point instructions and emulate them in software. Separate subdirectories in the GOFAST distribution contain an emulator specific to the Power PC 602 and an emulator, which supports other variants of the Power PC.

The second interface is through callable libraries. The product distribution contains directories, which are specific to each C compiler supported. The Embedded Application Binary Interface (EABI) is supported for both Metaware and Diab Data compilers and the emulator library interface is supported for the IBM compiler.

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## Functionality

GOFAST contains the following floating point routines in both single and double precision:

- ◆ add, subtract, multiply, divide
- ◆ conversion operations
- ◆ compare operations
- ◆ sin, cos, tan
- ◆ asin, acos, atan, atan2
- ◆ sinh, cosh, tanh
- ◆ log, log10
- ◆ exp, pow
- ◆ fabs, ceil, floor
- ◆ modf, fmod, frexp, ldexp

## Performance

GOFAST delivers the optimized performance you can expect with Power PC processor. The following timings were measured using the GOFAST EABI call library interface with a PPC 860T processor running at 50 MHz (25 MHz bus) and caching disabled. The benchmark program was built with the Diab Data C compiler.

### Microsecond Timings

Function	GOFAST library		DIAB DATA library	
	Double	Single	Double	Single
add	32.6	23.4	97.0	32.6
subtract	38.0	26.1	132.2	39.4
multiply	36.9	22.6	63.5	30.9
divide	61.2	30.0	413.1	131.9
sqrt	110.4	54.7	374.4	98.3
exp	221.3	68.9	1376.0	544.3
log	252.3	59.2	1475.1	585.9
log10	264.9	61.9	1537.1	616.8
sin	177.1	58.4	614.9	439.6
cos	174.3	57.7	732.4	474.4
tan	283.1	66.5	1090.8	507.9
asin	329.7	105.6	1174.0	572.7
acos	394.0	126.8	1303.3	610.0
atan	209.7	61.2	1383.7	622.7
atan2	259.1	80.0	1988.0	842.7
pow	469.9	138.3	8575.7	3166.7