

GoFast[®] for NEC V85x

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 NEC V85x includes drop-in libraries for “link and go” seamless operation with Green Hills C compiler. The GOFAST routines directly replace the compiler’s floating point runtime library routines.

Capabilities and Accuracy

GOFAST is reentrant. There is no need to perform any special state save/restore. GOFAST is ROMable. GOFAST is IEEE 754 and ANSI C compatible.

The basic functions + - * / and the conversions perform the IEEE 754 “nearest or even” rounding exactly. The other functions are accurate within one mantissa unit.

GOFAST routines make no distinction between quiet and signaling Not-a-Numbers (NaNs). In the case of an invalid operation, the answer is always a standard quiet NaN.

GOFAST routines support IEEE 754 masked exception handling for overflows and invalid operations. No unmasked exceptions are supported. Underflow and loss of precision are not reported. Division by zero is treated as an invalid operation.

Functionality

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

add, subtract, multiply, divide
compare operations
asin, acos, atan, atan2
log, log10
fabs, ceil, floor

conversion operations
sin, cos, tan
sinh, cosh, tanh
exp, pow
modf, fmod, frexp, ldexp

GOFAST Support

U S Software maintains a test lab where comprehensive confidence tests are performed on GOFAST in each target environment. A demonstration test program is included with your product delivery, and you are encouraged to run it on your own target hardware to verify system operation. Phone and fax support can be provided with the product. Extended support is also available.

Performance

GOFAST delivers the optimized performance you can expect with the NEC V85x processor. The following timings were measured using GOFAST library calls with an NEC V851 processor (at 6.6 MHz external xtal with 33 MHz PLL) on an RTE-V851-PC board. The test used the Green Hills v1.8.8 compiler.

Microsecond Timings

Library Function	Single Precision		Double Precision	
	GHS	GOFAST	GHS	GOFAST
add	58.0	24.0	99.0	36.0
subtract	82.0	28.0	137.0	45.0
multiply	692.0	126.0	632.0	104.0
divide	564.0	157.0	2076.0	322.0
sqrt	1432.0	344.0	8255.0	683.0
exp	1121.0	210.0	8260.0	923.0
log	2145.0	285.0	10392.0	1015.0
log10	2324.0	306.0	11075.0	1081.0
sin	942.0	169.0	7409.0	669.0
cos	1015.0	151.0	7489.0	669.0
tan	2385.0	317.0	10850.0	1312.0
asin	4993.0	762.0	24382.0	1846.0
acos	4912.0	911.0	18789.0	2179.0
atan	1984.0	283.0	13130.0	847.0
atan2	2680.0	424.0	15428.0	1169.0
pow	3732.0	542.0	19839.0	2003.0