

GoFast[®] for 68HC16 C Compilers

Features

- Fast
- Reentrant
- ROMable
- Conforms to IEEE 754
- Includes single and double precision
- "Link and Go" compiler support
- Includes C startup code
- Includes sscanf and sprintf
- Includes test programs and make files

Description

GOFAST[®] for 68HC16 was carefully designed for high performance operation and ease of use including "link and go" compatibility with 68HC16 specific C compilers. GOFAST provides full IEEE and ANSI compatible floating point support for the Motorola 68HC16 processor.

Speed

The HC16 is a fast processor, and GOFAST truly shows this. We have measured the following microsecond timings on a 16.78 MHz 68HC16 evaluation board:

Function	GoFast	Whitesmith C	Introl C
Divide	226	688	844
Sqrt	171	3284	4386
Exp	1348	2343	4354
log	1177	3015	5437
sin	963	1437	3708

Functionality

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

- + - * /
- conversion operations
- sqrt
- sin, cos, tan

- asin, acos, atan, atan2
- log, log10
- exp, pow
- floor, ceil, fabs
- modf, fmod, frexp, ldexp

Additional support includes a reentrant **sscanf** and **sprintf** as well as startup code, test programs and make files.

Compiler Support

GOFAST for 68HC16 includes dropin libraries for "link and go", seamless operation with the Whitesmith C compiler, Intral C compiler or Archimedes/Hi-Cross compiler. There is also assembly-level support for Intral, Motorola and Whitesmith.

The GOFAST routines directly replace the compiler's floating point runtime library routines. In addition, routines normally not supported by the compiler are available with GOFAST. An example might be the single precision version of the functions.

Capabilities and Accuracy

GOFAST is reentrant. There is no need to perform any special state saving or restoring. GOFAST is ROMable. GOFAST is IEEE 754 and ANSI C compatible.

The basic functions + - * / and the conversions perform the IEEE 754 "nearest 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 precision are not reported. Division by zero is treated as an invalid operation.

Technology

GOFAST 68HC16 is based on U S Software's "Architecture Independent Technology" (AIT) and floating point algorithms that the company has been developing for over decade. The algorithms have been thoroughly tested using automated methods. The actual machine code is generated by a special floating point translator.

GOFAST Support

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