GoFast® for 8051 Family

Features

- Fast
- ROMable
- Conforms to IEEE 754
- Includes single and double precision
- Includes test programs

Description

GoFast® for 8051 was carefully designed for high performance operation on 8051 and derivative architectures. The product optimizes for a balance of space and speed. It is integrated with Keil C51. For other compiler support, please contact us.

Functionality

GoFast for 8051 contains the following floating point routines in both single and double precision:

- add, subtract, multiply, divide
- conversion operations
- comparison operations
- sin, cos, tan, atan
- sqrt
- log, log10
- exp, pow
- fabs, ceil, floor

GoFast for 8051 implements a floating point accumulator (FAC) in read-write memory. Operations and functions are performed using the value in FAC.

GoFast for 8051 is not naturally reentrant. However, reentrancy can be achieved by saving/restoring the FAC and other GoFast temporaries during a context switch. An application note included with the product describes the procedure.

Floating Point Technology

GoFast for 8051 is based on proven floating point algorithms developed over a decade. The algorithms have been thoroughly tested using automated methods. GoFast was specifically optimized and integrated for high performance on 8051 processors.

Timings

The following table gives the times for all floating point operations, for GoFast and the Keil floating point library. The times, in microseconds, were measured using the indicated processor and evaluation board. The single precision routines in the Keil C library are generally faster than those in GoFast, but Keil does not offer double precision routines. (If you only need single precision and you are using Keil, you probably don't need GoFast.) Thus, the routines linked are a mixture of both libraries, as indicated in **bold** below.

Microsecond Timings

C8051F330, 25 MHz

	Double-Precision		Single-Precision	
Function	**GoFast**	**Keil**	**GoFast**	**Keil**
add	116.4	–	53.8	**20.3**
sub	115.7	–	59.1	**22.3**
mul	200.0	–	71.9	**21.5**
div	675.3	–	155.6	**89.2**
sqrt	2224.4	–	361.7	**220.1**
exp	4180.0	–	881.6	**515.1**
log	2626.3	–	731.0	**396.9**
log10	2788.0	–	778.6	**416.9**
sin	2480.2	–	566.4	**324.1**
cos	2509.4	–	557.5	**321.3**
tan	3108.6	–	962.7	**525.1**
atan	2876.7	–	753.2	**401.8**
pow	6935.4	–	1639.9	**953.9**
fabs	3.4	–	**3.3**	3.8
floor	56.6	–	**15.1**	186.7
ceil	56.8	–	**15.2**	186.6
cmp	75.1	–	37.8	**9.0**
char to fp	36.1	–	**14.9**	20.7
uchar to fp	35.0	–	**12.6**	20.7
short to fp	34.0	–	15.3	**12.5**
ushort to fp	33.7	–	15.1	**12.5**
long to fp	30.9	–	13.1	**12.0**
ulong to fp	29.1	–	9.8	**9.5**
fp to char	28.4	–	**19.2**	20.7
fp to uchar	28.2	–	**18.9**	20.7
fp to short	31.3	–	21.2	**20.9**
fp to ushort	30.9	–	**17.9**	20.9
fp to long	43.2	–	27.6	**21.2**
fp to ulong	43.2	–	27.6	**21.2**
abs char	–	–	**2.7**	2.9
abs short	–	–	**2.6**	2.7
abs long	–	–	**3.2**	4.2
sgl to dbl	50.6	–	–	–
dbl to sgl	49.7	–	–	–

Times were measured on Silicon Laboratories C8051F330DK board with Keil C51 v8.16.