

## Hidden Goodies in Fortran H Version 1

There are numerous internal functions in Version 1 of the H Level Fortran Compiler that were used in writing the compiler itself. They have some limitations:

1. they are unsupported by IBM, which means that they could disappear overnight;
2. there is no assurance that the same functions will be in the forthcoming Version 2;
3. the use of these names can cause conflicts with externally-defined routines with the same names.

The advantages are that considerably faster code can be generated for some applications, and that once a routine is in object module form one needn't necessarily worry about subsequent changes to the compiler.

The functions and their arguments are given in Table I; the meanings of the terms there are:

I*4	fullword integer
R*4	short floating-point
any *4	any quantity on a fullword boundary
integer	a numeric decimal integer constant ( <u>not</u> a variable name)
any	any variable name ( possibly subscripted).

Note that the functions ~~BITON~~, ~~BITOFF~~, and BITFLP must be written as integer function calls, and not subroutine calls, even though no value is assigned to the variable on the left of the equal sign. That is,  $K = \text{BITON}(N,10)$  will turn on (set to 1) the 10th bit at N, but K will remain unchanged. The bits of a word or other quantity in memory are numbered from the left beginning at zero; thus, to invert the sign of the floating-point number A, one could write either  $A = -A$  or  $N = \text{BITFLP}(A,0)$ . The latter is faster.

Incorrect argument types will generally lead to incorrect code, with no **warning messages**; the use of the LIST option is therefore recommended during **debugging**.

Name	Type	Arguments	Action
LAND	I*4	any*4, any*4	Logical And
LXØR	I*4	any*4, any*4	Logical Exclusive Or
LØR	I*4	any*4, any*4	Logical Or
LCØMPL	I*4	I*4	One's Complement (Bitwise Complement)
AND	R*4	any*4, any*4	Logical And
ØR	R*4	any*4, any*4	Logical Or
SHFTL	I*4	any*4, I*4	Logical Left Shift by (arg 2) bit positions
SHFTR	I*4	any*4, I*4	Logical Right Shift by (arg 2) bit positions
MØD24	same as argument	any *4	High-Order Byte set to 0 (LA instruction)
TBIT	I*4	any, integer	Value (0 or 1) of (arg 2) bit of (arg 1).
BITØN	(I*4)	any, integer	Bit (arg 2) of (arg 1) is set to 1
BITØFF	(I*4)	any, integer	Bit (arg 2) of (arg 1) is set to 0
BITFLP	(I*4)	any, integer	Bit (arg 2) of (arg 1) is inverted.