To: J3
From: /interop
Date: September 19, 2000
Title: Unresolved Issue 249
Rounding mode changes in procedures

References: J3/00-264

Unresolved issue 249, p. 365, has two parts:

First, a procedure is supposed to save and restore the rounding mode in effect on entry to the procedure. The question is whether a procedure defined by means other than Fortran should have the same requirement; that is, can a caller of a non-Fortran procedure assume that it does not alter the rounding mode.

Secondly, the editor wonders why the requirement that the rounding mode be preserved exists to begin with.

For the second issue, it was once again confirmed at the WG5 meeting in Oulu that the requirement to preserve the rounding mode was WG5's intention (see J3/00-257 which is WG5/N1406).

During discussions it was discovered that there are a number of other requirements placed on the processor related to IEEE status flags. There are three different sets of status flags:

1. Signaling and Quiet flags (IEEE_SET_FLAG, IEEE_GET_FLAG)
2. Rounding modes (IEEE_SET_ROUNDING_MODE, IEEE_GET_ROUNDING_MODE)
3. Halting flags (IEEE_SET_HALTING_MODE, IEEE_GET_HALTING_MODE)

There is also an omnibus pair of routines that can set or get all of the status flags at once: IEEE_SET_STATUS, IEEE_GET_STATUS.

This paper addresses two issues:

1. Procedures defined by means other than Fortran cannot be required to preserve status flags.
2. Text needs to be added to indicate that IEEE_SET_STATUS can alter all of the status flags.

Edits:

[364:25] Change:
"other than IEEE_SET_ROUNDING_MODE" to "other than IEEE_SET_ROUNDING_MODE or IEEE_SET_STATUS"

[365:28-29] Change:
"other than IEEE_SET_HALTING_MODE" to "other than IEEE_SET_HALTING_MODE or IEEE_SET_STATUS"

[365:1-22] Delete unresolved issue #249

[365:32-35] Change to read:
The values of all the supported flags for exceptions, rounding mode, and halting are called the floating point status. The subroutine IEEE_GET_STATUS gets the value of the floating point status into a scalar variable of type TYPE(IEEE_STATUS_TYPE). There are no facilities for finding the values of particular flags held within such a variable. The subroutine IEEE_SET_STATUS sets the value of the floating point status. The subroutines IEEE_GET_FLAG, IEEE_GET_HALTING_MODE, and IEEE_GET_ROUNDING MODE get portions of the floating point status. The subroutines IEEE_SET_FLAG, IEEE_SET_HALTING_MODE, and IEEE_SET_ROUNDING_MODE set portions of the floating point status.

Note 15.x. The processor is required to ensure that a call to a Fortran subprogram does not change the floating point status. No such requirements can be placed on procedures defined by means other than Fortran. For such procedures, it is the responsibility of the user to ensure that the floating point status is preserved.

[370:38] Add "(15.5)" after "floating point status"
[375:34] Add "(15.5)" after "floating point status"