IE3CONV	CERN Program Library	M220

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Library: KERNLIB
Submitter :
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Conversion To and From IEEE Number Format

These routines convert vectors of single- or double- precision numbers between the internal and the standard IEEE representations.

Structure:

SUBROUTINE subprograms
User Entry Names: IE3FOS, IE3FOD, IE3TOS, IE3TOD

Usage:

IEEE **for/to internal, single precision:**

```
CALL IE3FOS(VSINGL,VIEEES,NV,JCODE)
CALL IE3TOS(VIEEES,VSINGL,NV,JCODE)
```

VSINGL Vector of NV words with floating point numbers in internal representation.

VIEEES Vector of NV words with the same floating point number in IEEE representation.

NV Size of the vectors.

JCODE Error code returned, normally zero,otherwise VSINGL(JCODE) is the last number which had conversion problems, such as overflow and not-a-number.

IEEE **for/to internal, double precision:**

```
CALL IE3FOD(VDOUBL,VIEEED,NV,JCODE)
CALL IE3TOD(VIEEED,VDOUBL,NV,JCODE)
```

VDOUBL Vector of 2*NV words with NV double-precision floating point numbers in internal representation.

VIEED Vector of 2*NV words with the same floating point numbers in IEEE representation.

NV Size of the vectors.

JCODE Error code returned, normally zero, otherwise VDOUBL(JCODE) is the last number which had conversion problems, assuming the declaration DOUBLE PRECISION VDOUBL(NV).

Notes:

The IEEE format provides for representing exceptions, both for single and for double precision:

a) Not-a-number:	single	7F8nnnnn,
	double	7FFnnnnn....
b) Positive infinity:	single	7F800000,
	double	7FF00000....
c) Negative infinity:	single	FF800000,
	double	FFF00000....

Depending on the machine, mapping is done either naturally or artificially:

CDC	Indefinite maps to not-a-number, overflow to infinity.	
CRAY	Overflow maps to infinity, not-a-number gives overflow.	
IBM	Positive infinity	maps to internal `7FFFFFF0`,
	not-a-number	maps to internal `7FFFFFFF`.
NORD	Positive infinity	maps to internal `177...70`,
	not-a-number	maps to internal `177...77`.
VAX	Positive infinity	maps to internal `00007F81`,
	not-a-number	maps to internal `00008001`.

Underflow gives exact zero in all cases.

On the VAX: if a file has been imported from a big-endian machine, byte-inversion (see `VXINV` (M434)) has to be done before calling `IE3TOx`; similarly byte-inversion has to be done after calling `IE3FOx` and before exporting the file.

On machines where the internal representation is `IEEE` (Apollo, Sun, Silicon Graphics, etc) these routines are simple copy operations.

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