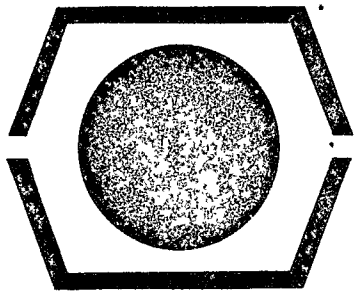

DECUS
PROGRAM LIBRARY

DECUS NO.	8-375B
TITLE	3 PAGE FLOATING POINT PACKAGE WITH FLOATING OUTPUT
AUTHOR	Richard Rothman
COMPANY	Digital Equipment Corporation Maynard, Massachusetts
DATE	August 14, 1970
SOURCE LANGUAGE	PAL-10, VERSION 141

3 PAGE FLOATING POINT PACKAGE WITH FLOATING OUTPUT

DECUS Program Library Write-up DECUS No. 8-375B

This write-up describes a 3 Page Floating Point Package whose distinguishing characteristic is that in 3 words it packs 27 bits.

The 3 word format is as follows:

	SM EXCESS 2ØØ EXPONENT MANTISSA
WORD 1	0 000000000 0 0 0
WORD 2	0 0 0 0 0 0 0 0 0 0 0 0
WORD 3	0 0 0 0 0 0 0 0 0 0 0 0

SM - SIGN OF MANTISSA. IF SM=1 then the # is CONSIDERED NEGATIVE; IF SM=0 then it is POSITIVE. The Mantissa is always in POSITIVE form, only the SIGN Bit indicates the sign. To negate a number, simply complement the sign bit.

Exponent - It is EXCESS 2ØØ, meaning the exponent is always 2ØØ + the true binary exponent. For example, 2, which in floating point binary is the following .10000 x 2^2 is stored as follows in excess 2ØØ format:

WORD 1: 2024 (SM=Ø.)
WORD 2: ØØØØ
WORD 3: ØØØØ

FLOATING INSTRUCTIONS

INSTRUCTION	CODE	FUNCTION	TYPE
FGET	ØXXX	(FAC)<——(EA)	MRI
FADD	1XXX	(FAC)<——(FAC)+(EA)	MRI
FSUB	2XXX	(FAC)<——(FAC)-(EA)	MRI
FMUL	2XXX	(FAC)<——(FAC)x(EA)	MRI
FDIV	4XXX	(FAC)<——(FAC)÷(EA)	MRI
FJMP	5XXX	FPC <——(EA)	MRI
FPUT	7XXX	(EA) <——(FAC)	MRI

FEXT	ØØØØ	LEAVE INTERPRETOR
FNOR	6ØØØ	NORMALIZE FAC
FSKP	66ØØ	SKIP NEXT INST
FSNE	664Ø	SKIP NEXT IF (FAC)≠Ø
FSEQ	665Ø	SKIP NEXT IF (FAC)=Ø
FSGE	67ØØ	SKIP NEXT IF (FAC)> Ø
FSLT	671Ø	SKIP NEXT IF (FAC)<Ø
FSGT	664Ø	SKIP NEXT IF (FAC)>Ø
FSLE	675Ø	SKIP NEXT IF (FAC)≤Ø

NOTE:		
	FAC	-Floating AC
	(FAC)	-Contents of Floating AC.
	EA	-Effective Address
	(EA)	-Contents of effective address
	FPC	-Floating PC.

For core usage a listing should be referred to. In case of an error, the package HALTS. This can be fed by simply re-assigning the symbol ERROR to something more useful.

This package was written by Mark Bramhall, but arranged into a stand-alone package by Richard Rothman.

No floating I/O is contained in this package.

CORE USAGE	50 - 64, 5400 - 6177
ERROR LOCATION:	5525, 6046, 6064 THESE CONTAIN HALTS. THEY CAN BE PATCHED TO SOMETHING ELSE OR REASSEMBLED
MEANING OF ERROR:	5525 - Exponent overflow 6046 - Exponent underflow 6064 - Division by Ø.

3 PAGE FLOATING POINT PACKAGE WITH FLOATING OUTPUT

If this version is used, core usage, in addition to that mentioned above is: 6200-6377, 6400-6501, 6566-6577.

Floating point output is unformatted. Seven digits are typed. The seventh digit is rounded up from the 8th (which is not printed). Format of output is: ±X.XXXXXXE+XX or ±X.XXXXXXE-XX. When calling this routine internally, the FAC should contain the #. A JMS is made to location 6200. On return the # has been typed (no CR's or LF's) and the FAC=Ø.