UNIVERSITY OF ILLINOIS

DIGITAL COMPUTER

LIBRARY ROUTINE N 16 - 286

TITLE: Mixed Number Input (DOI or SADOI)

TYPE: Closed with standard entry

NO. OF WORDS: 41

ACCURACY: $\pm 2^{-79}$

SPEED: Input time + 1.7 ms

USE: Enter the subroutine with link address in Q. The number to be read must be punched on tape subject to the following conditions and in the following order:

1. Sign digit (do <u>not</u> omit + for positive number).
2. Up to 12 digits in integer part N, with $+549,755,813,877 \geq N > -549,755,813,888$. Fifth hole characters of any kind except a decimal point may separate the digits of the integer part.
3. Decimal point. If there is no integer part, the decimal point may follow directly after the sign.
4. Up to 12 digits in the fractional part F, where $|F| \leq .999999999999$, and <u>no fifth hole characters may separate the digits of F</u>.
5. <u>Any</u> fifth hole character to terminate input of the number.

On exit from this routine, the double-length number N. F will be in AQ, integer part in A and fractional part in Q, with $q_0 = 0$. The number will have the proper 79-digit <u>two's - complement</u> representation, whereas the number as punched on the tape is in sign - absolute magnitude representation.

If the sign digit is omitted, the routine will stop on an FF stop in location 4, relative.

EXAMPLE: Proper input format may be in the forms

+0.0, +., -0.0, -2.7, +333,333,333.500 00,

but the format

+5,000.000,000

is incorrect because of the 5th hole character among the digits of the fractional part.

DATE January 20, 1960
WRITTEN BY John Ehrman
APPROVED BY J N Snyder

ns

LOCATION	ORDER	NOTES PAGE 1 N 16
	00K (N16)	
0	L5 19L	
	42 17L	Set first list address for fractional part
1	41 1F	
	K5 F	R. H. A. used to save sign bit
2	42 26L	
	81 4F	Plant link and read sign
3	L0 28L	
	42 1L	Plant sign bit
4	36 8L	
	FF F	Jump to input integer part
5	10 3F	
	L4 1F	
6	00 2F	
	L4 1F	
7	00 1F	
	40 1F	
8	91 4F	
	36 5L	
9	L0 28L	
	40 F	Test for decimal point
10	L7 F	
	36 8L	
11	27 14L	
	10 3F	Input fractional part
12	L4 2F	
	00 2F	
13	L4 2F	
	00 1F	
14	40 2F	
	F5 17L	Step list address
15	42 17L	
	42 18L	
16	91 4F	

LOCATION	ORDER	NOTES PAGE 2 N 16
	32 11L	Terminate reading of fractional part on 5th hole character
17	L5 2F	
	50 F	
18	S0 F	
	66 F	Compute properly rounded fractional part
19	10 1F	
"	SJ 27L	
20	40 2F	
	L5 1L	
21	50 29L	
	00 39F	Check sign bit
22	36 27L	
	89 1F	here if -
23	L0 2F	
	36 25L	Take negative of fractional part
24	L1 1F	
	26 26L	F = 0, take negative of integer part
25	40 2F	
	F1 1F	Store fractional part, complement integer part
26	50 2F	
	22 F	fractional part to Q, exit via link
27	L5 1F	
	26 26L	if +, exit immediately
28	00 F	
	00 10F	Constant to test for signs and decimal point
29	00 F	
	00 5F	
30	00 F	
	00 50F	
31	00 F	
	00 500F	
32	00 F	
	00 5000F	Table of $1/2\ 10^{n_f}$,
33	00 F	

LOCATION	ORDER	NOTES	PAGE 3	N 16
	00 5000 0F			
34	00 F			
	00 5000 00F			
35	00 F			
	00 5000 000F	n_f = no. of digits in fractional part		
36	00 F			
	00 5000 0000F			
37	00 F			
	00 5000 0000 0F			
38	00 F			
	00 5000 0000 00F			
39	00 F			
	00 5000 0000 000F			
40	00 F			
	00 5000 0000 0000F			