RECOMP II USERS' PROGRAM NO. 1079

PROGRAM TITLE:	DECIMAL INPUT ROUTINE
PROGRAM CLASSIFICATION:	Utility
AUTHOR:	W. Wellman Servomechanisms, Inc. Research Division Goleta, California
PURPOSE:	This routine is used to permit a program to call for the manual entry of a decimal number during the course of the program.
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DECIMAL INPUT ROUTINE

PURPOSE:

This routine is used to permit a program to call for the manual entry of a decimal number during the course of the program.

USE:

A. Calling Sequence

1. This routine is normally called by the use of the trapping mode pseudocommand "IND" followed by the address in which the number is to be stored. Thus "IND 1234.0" signifies, "input a decimal number and store it in location 1234."

The half-word bit of the address signifies "fixed point" if a "0" or "floating point" if a "1". (If the "b" of a number is made minus zero, the number will be entered as floating point, regardless of the half-word bit.)

2. For use without the trapping mode, the following is the calling sequence:

```
                    TRA          (location of this routine)
                    CLA          w w w w . x
```

Here w w w w is the address in which the number is to be stored; x is the half-word-bit code, as above; the TRA instruction must be in a right half-word and immediately followed by the code word.

B. Entry and Exit

Enter routine with b (if a fixed point number is to be input) in the R-register, @39.

Exit from routine with number in accumulator, and b or exponent @39 in R-register. Fixed point numbers will also be stored in their specified location; floating point numbers will be stored in that location, with the exponent in the following word, in proper format.

C. Address Display (Incidental Feature)

1. TRA (location of this routine +26.0)

2. The bits in the right half address position (but for the half-word bit, which is ignored) of the accumulator will be interpreted as four octal digits, converted into BCD, stored in 7770, and displayed.

D. Entering Number

1. When this routine is ready to accept a number, the "alpha" pilot will light. Enter the number at the console keyboard, using the decimal point if it is required. The decimal may be entered as often as desired, but only the first decimal point is recognized.

2. The sign may be entered at any time (before, after, or in the middle of a string of digits), and as many times as whim or fumbling demands. The last sign entered is displayed and used to set the sign of the number. If no sign is entered, the number will be assumed to be positive and displayed as positive.

3. The individual digits of the number (including the decimal) are displayed as they are entered. Digits should not be entered much faster than 5 digits per second.

4. To terminate the string, push the "enter" key; return is made to the main program with the number in normalized floating point in the A and R registers.

5. If an error is detected while the numeric digits are being entered (before pushing the enter key), it may be corrected by pushing the "clear" button, which clears the display and allows the number to be re-entered correctly.

6. In no case should <u>any</u> of the start or display buttons be pressed while a number is being entered.

E. Error Indication

There is no error return in the calling sequence. For fixed point numbers; if the specified b will not hold the number, the b is displayed in command format and the computer halts. Pushing start will allow a new entry to be made. Return to the program will not occur until a number that can be held at this b is entered. No error indication is given for floating point numbers.

RESTRICTIONS:

A. Accuracy

1. At least 38 significant numeric bits of the number are retained correctly at all times; numbers, therefore, have a relative error less than 1 x 10^{-11}. Integers less than 2^{38} are converted exactly, as are all numbers which are entered in less than twelve digits and whose exact binary equivalent is expressable in less than 38 significant bits

(11/8 + 1/1024 = 1.3259765625, for example).

Fixed point numbers are not rounded before they are shifted (de-normalized) to the specified b and may thus be in error in the least significant bit.

B. Range: More digits than will be entered in usual practice

$(10^{-10^{11}} < \text{number} < 10^{10^{11}})$,

however, only the last 15 digits entered will be displayed.

C. Digits should not be entered at a rate much faster than 5 per second. Faster entry will make the display and perhaps the number incorrect. If the display is correct, the number will be correct.

D. Storage: 120 octal sectors, including:

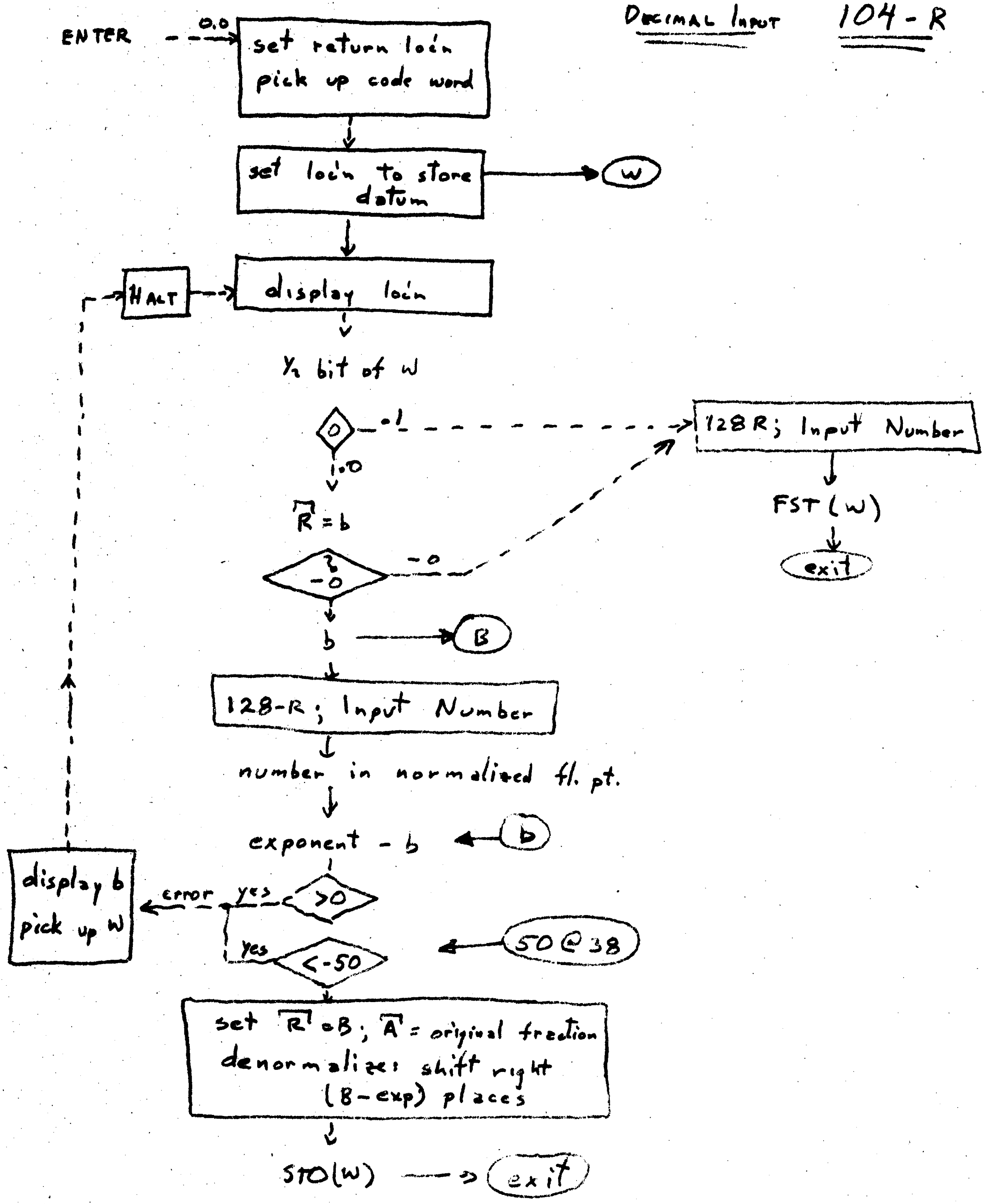
1. SMI 128R (L_o + 40 through L_o + 117) Floating point console input

2. SMI (L_o + 25 through L_o + 37) Address Display

UNITERMS:

Data, Number , Binarization, Input, Address Display

Decimal Input 104-R



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Program No. 104-R Title CONSOLE INPUT & ADDRESS DISPLAY

Programmed by: W. Wellman Date 5-2-61

Loc'n	Cm'd	Addr.	Contents	Accumulator	b	Remarks
[illegible] 00	SAX	77700				
	ADD	1050				
1	STA	0021	code loc'n			
	ADD	1050				
2	STA	0221	exit			
	CLA	—		code		
3	STA	0220				
	ARS	00240				
4	STA	0071				
	FST	77600				
5	TRA	0260				
	CLA	0070				
6	EXT	1050				
	TZE	0101				
7	TRA	0401	float			
	FST	—				
[illegible] 1.0	TRA	0221				
	CLA	77610		B		
1	TPL	0120				
	TZE	0070	= 0	B = -zero ?		
2	STO	0230	B			
	TRA	0401				
3	XAR	00000		exp.		
	SUB	0230		exp - b		
4	TZE	0161				
	TPL	0161				
5	DIS	0230	error	display b		
	FCA	0220		pick up b & loc'n		
6	HTR	0031				
	ALS	00010				
7	STA	0211				
	ADD	0240	50@38			
[illegible] 20	TMI	0150	→ more than 50 shifts = error			
	CLA	0230		B		
1	XAR	00000				
	ARS	—	denormalize			
2	STO	—				
	TRA	—	EXIT			
3			B			
4	+00	00000	50@38			
	-00	00620				
5	+00	00000				
	-00	77770				
6	CTV	0300				
	SAX	77670				
7	ADD	0370	1@39			
	TRA	77710				

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Program No. 104-R Title

Programmed by: Date

Loc'n		Cm'd	Addr.	Contents	Accumulator	b	Remarks
30		+00	00051				
		-00	00740	-0000631 gives "o" after bin.			
1		STA	77761				
		CLA	77671				
2		EXT	0250		1 address		
		ALS	00060				
3		ADD	77700				
		TOV	77760				
4		ALS	00030				
		STO	77700				
5		EXT	77770				
		TRA	77730				
6		DIS	77701				
		TRA	———				
7		+77	77771				
		+00	00001				
7040			↑				
				SMI #128-R			
				Console Input			
			↓				
HT +17							