

UNIVERSITY OF ILLINOIS  
DIGITAL COMPUTER

LIBRARY ROUTINE Y 3 - 201

TITLE                   Input Routines to Drum Memory  
TYPE                    Closed with standard link  
NUMBER OF WORDS        148 words  
TEMPORARY STORAGE     0, 1, 2  
DURATION                Approximately the reading time  
DESCRIPTION

The routine will take any library routine and store it on the drum preserving all the terminating symbols of Library Routine X-1 (Decimal Order Input). The routine being stored on the drum is modified so that the Drum Playback for Routines Y-2 can bring the routine off the drum and store it arbitrarily in the Williams memory with the same degree of freedom as if it were being input on tape by means of X-1.

The material to be stored on the drum should be preceded on tape by

00 mK

where m is the drum location starting at which the material is to be placed, and terminated by the combination 00 N.

To determine the exact number of drum locations necessary, use the following formula

$$d = \frac{4n + a + b + 1}{5}$$

rounded up to the nearest multiple of 5.

Add one to the numerator for each interlude to be recorded.

d: the number of drum locations necessary

n: the number of words in the routine, including interludes.

a: the number of addresses  $\geq 64$  preceding all symbols (including the J symbol).

b: the number of S symbols with addresses  $> 0$ .

DATE <u>October 12, 1955</u>
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APPROVED BY <u>Jpnash</u>

LOCATION	ORDER		NOTES PAGE 1
0	K5 F 42 133L		set link
1	41 F 41 1F		
2	41 2F 41 121L		
3	L5 2F 50 120L		Essentially clear Q
4	00 32F 40 115L		store previous ten digits 2 <sup>-7</sup> in 115L
5	81 8F 40 2F		Input fcn. digits to store in 2
6	26 134L L0 116L		
7	70 116L S5 13L		
8	40 1F 81 4F		Read in address digits to store in 1
9	50 1F L4 116L		
10	32 6L L4 7L		Obey if symbol < 10
11	42 12L 50 120L		Set 26 order address according to type of symbol, Q ~ 0, address in A
12	L5 1F 26 ( )F		
13	L5 2F 26 76L		K
14	L0 117L 26 61L		S
15	L3 2F 22 78L		N
















Abv.- Function-fcn.

LOCATION	ORDER		NOTES	PAGE 2
16	50 1F 26 84L		J	
17	L0 117L 22 45L		F	
18	L0 117L 32 56L		L	
19	L4 117L L4 117L		Obey if address $\geq 64$ $+ 2^{-33}$ $+ 2^{-33}$	
20	40 1F L5 F			
21	00 8F L4 1F		Insert another 8-bit block into Word 0 containing already modified 8-bit blocks	
22	40 F F5 121L			
23	40 121L L0 118L		Have 5 8-bit blocks been inserted?	
24	36 44L L5 F		→ yes	
25	00 8F L4 2F		Add fcn. symbols to previously modified 8-bit blocks of Word 0 to Store in 0.	
26	40 F F5 121L			
27	40 121L L0 118L		Count-have 5 8-bit blocks been inserted?	
28	32 42L 26 (3L)			
29	19 4F 40 121L			
30	41 1F 50 1F			
31	01 8F L4 1F			
32	00 8F 40 1F		Reverse word 0 by	

LOCATION	ORDER	NOTES	PAGE 3
33	L5 F 10 8F		by 8-bit blocks
34	40 F L5 121L		and
35	L4 121L 40 121L		Store it on the drum.
36	36 31L 01 8F		
37	L4 1F 26 38L		waste
38	(86 11F) (00 F)		
39	F5 38L 40 38L		Advance drum addresses
40	41 121L 26 ( ) F		Reset counter Possible addresses 3L, 41L, 96L, 67L, 54L, 133L
41	L5 2F 40 F		Put fcn. digits in location 0
42	22 26L L5 28L		Set switch address of 40 L
43	42 40L 26 29L		properly ( to 3L or 96L )
44	F5 44L 42 40L		Set switch address of 40 L to 41L
45	26 29L 36 58L		→ address $\geq$ 64 ? <input type="checkbox"/> F
46	L4 117L 26 19L		
47	L5 F 50 120L		Address $\geq$ 64
48	00 8F 40 F		Divide by 64, place quotient in location 0,
49	L5 1F 10 6F		and store remainder

LOCATION	ORDER		NOTES	PAGE 4
50	L4 F 40 F		temporarily in location 1.	
51	01 6F 40 1F			
52	F5 121L 36 121L		Count- Have 5 8-bit blocks been inserted	
53	L0 118L 36 55L			
54	L5 1F 22 ( )F		Put remainder in A (19L, 59L, 62L, 41L)	
55	L5 58L 42 40L		Set switch address of 40L to (54L)	
56	26 29L L5 46L		Address $\geq$ 64, L symbol.	
57	42 54L 26 47L		Set switch address of 54L to 19L	
58	F5 45L 42 54L		Address $\geq$ 64, F symbol. Set switch address of	
59	26 47L L5 1F		54L to (59L)	
60	L4 117L 22 19L		For f symbol	
61	36 72L L3 1F		address $\geq$ 64? address = 0	S
62	36 67L L5 F		→ yes	
63	50 120L 00 8F		Add another 8-bit block to word 0 containing other modified 8-bit blocks	
64	L4 1F 40 F			
65	F5 121L 40 121L		Count - Have 5 8-bit blocks been inserted yet?	
66	L0 118L 32 73L			

LOCATION	ORDER		NOTES	PAGE 5
67	L5 F 00 8F			
68	40 F 81 4F		Read in the character after the S symbol	
69	L4 117L L4 117L		Add $2^{-32} + 2^{-33}$	
70	L4 117L L4 F		Add another 8-bit block to word 0	
71	40 F 22 22L			
72	F5 14L 42 54L		Address $\geq 64$ , S symbol Set switch address of 54L to (67L)	
73	26 47L L5 75L		Set switch address of 40L to 67L	
74	42 40L 26 29L			
75	00 F 00 67L		Constant	
76	00 12F L4 1F		Set address for the drum	K
77	L4 119L 40 38L		record order	
78	26 5L 36 125L		Stop storing on drum	N
79	11 1F L4 117L		Clear A	
80	L4 117L L4 117L		Form $2^{-32} + 2^{-33}$	
81	40 1F L5 F		Set the 8-bit symbol for an interlude	
82	00 8F L4 1F			
83	40 F 22 26L		in word 0	

LOCATION	ORDER	NOTES PAGE 6
84	7J 122L L4 115L	$X 2^{39}/10^{12}$ add previous fcn.digits <span style="float: right;">J</span>
85	40 115L L5 123L	 Set transfer address of 28L to 96L
86	42 28L L5 115L	 Put all but ten bits in Q
87	10 32F 32 88L	 if fcn.bits are 80, add
88	F4 124L 40 2F	 $2^{-31}$ to remove 1's carried by shifting.
89	01 12F 40 1F	 function in 2 address in 1
90	L3 121L 36 135L	 counter = 0?
91	L1 121L L4 120L	
92	32 100L F1 120L	 counter = 1 Set counter
93	L4 121L 40 121L	 back by 2
94	L5 F 10 16F	 Take out last 2 8-bit blocks in word 0
95	40 F 26 58L	
96	L5 114L 42 28L	 Set transfer address of 26L to (3L)
97	L5 115L 10 20F	
98	01 8F 40 2F	 Set 2nd half of J symbol word so that it
99	01 12F 40 1F	 will be stored properly.

LOCATION	ORDER		NOTES	PAGE 7
100	26 58L L5 58L		Set transfer address of	
101	42 40L F5 45L		40 L to (54L) Set transfer address of 54L	
102	42 54L L5 38L		to (41L) Set address of record	
103	L0 120L 40 38L		order down by 1	
104	50 120L L1 120L		Set playback order in	
105	00 32F L4 38L		107L	
106	40 107L 26 107L		waste	
107	(85 11F) (00 F)		Playback last word stored in drum	
108	00 1F 10 1F		Put 0 in 2 <sup>0</sup> position	
109	40 F L5 1F		Divide address by 64	
110	10 6F 40 1F		Put quotient in 1	
111	01 6F 50 1F		Put Quotient in Q to remainder in 1	
112	40 1F S5 F		Add 1st 8-bit block	
113	00 32F L4 F		of the J symbol word to word in 0.	
114	26 38L 00 3L		To record in drum	
115	00 F 00 F			



LOCATION	ORDER		NOTES	PAGE 8
116	7L 4095F LL 4086F		(1-10) . 2 <sup>-39</sup>	
117	00 F 00 64F		Constants	
118	00 F 00 5F			
119	86 11F 00 F			
120	00 F 00 1F			
121	00 F 00 F			
122	46 1510F 60 1208F		2 <sup>39</sup> /10 <sup>12</sup>	
123	00 F 00 96L			
124	00 F 00 255F			
125	50 123L L5 0F		Stop storing on drum	
126	00 8F L4 124L		Set LL in word 0	
127	40 F F5 121L		Count - Have 5 8-bit	
128	40 121L L0 118L		blocks been inserted	
129	32 131L L5 F		→ yes	
130	00 8F 40 F		Insert a sufficient number	
131	22 127L L5 L		of 8-bit blocks to = 5, thus	
132	42 40L 26 29L		placing the LL block in	
			proper position.	
			Set switch address	
			of 40L to (133L)	

LOCATION	ORDER		NOTES	PAGE 9
133	22 133L		waste	
	22 ( )F		link out	
134	41 1F			
	22 8L		Clear 1	
135	F5 44L		Set switch address	
	42 40L		of 40L to (41L)	
136	L5 38L			
	L0 120L		Set address of record	
137	40 38L		order down by 1.	
	50 121L		Q ~ 0	
138	L1 120L			
	00 32L		Set playback order	
139	L4 38L		in 140 L	
	40 140L			
140	00 F		Playback last word	
	00 F		stored in drum	
141	00 9F		Set $2^{-8} = 0$ so that the	
	10 9F		left-most digit = 0	
142	40 F			
	L5 1F		Divide address by	
143	10 6F		64, Quotient in	
	40 1F		1	
144	F5 120L			
	00 38F		Add $2^0$ + least significant	
145	L4 F		part of address in	
	40 F		0	
146	L5 1F		Add most significant part	
	00 24F		of address to	
147	L4 F		0	
	26 38L		to record on drum.	