

# Binary Tape Punch - Reader V2\_22

This version echos all inputs to TTY printer

Step	Label	Addr	Code	Mnem	Comments
0	Readbin START	000	106	CAL	Call TTYIN
1		001	063		
2		002	001		
3		003	074	CPI	Compare to
4		004	000		NULL
5		005	150	JTZ	Jump if not ready to start START
6		006	000		
7		007	001		
8		010	074	CPI	Compare to
9		011	125		Start symbol
10		012	110	JFZ	Jump if not ready to start START
11		013	000		
12		014	001		
13	get load addr	015	106	CAL	Call TTYIN
14		016	063		
15		017	001		
16		020	360	LLA	Set up load start address, A to L
17		021	106	CAL	Call TTYIN
18		022	063		
19		023	001		
20		024	350	LHA	Set up load addr, hi, A to H
21		025	106	CAL	Call TTYIN
22		026	063		
23		027	001		
24		030	370	LMA	Save in mem at counter addr
25	SNCNT	031	026	LCI	Set NULL counter
26		032	020		16 NULLs = stop
27	NEXTADD	033	060	INL	Increment Lo save addr
28		034	110	JFZ	Page not full, Jump to GETNEXT
29		035	040		
30		036	001		
31		037	050	ICH	Page full, next page please...
32	GETNEXT	040	106	CAL	Call TTYIN, get next
33		041	063		
34		042	001		
35		043	370	LMA	Save in mem at counter addr
36		044	074	CPI	Is it a NULL?
37		045	000		
38		046	110	JFZ	Not part of end, jump to SNCNT
39		047	031		
40		050	001		
41		051	021	DCC	Decrement C, end counter
42		052	302	LAC	Copy C to A
43		053	121	OUT0	Display end count on LEDs
44		054	110	JFZ	Not end yet... NEXTADD
45		055	033		
46		056	001		
47		057	377	HLT	Halt - change to Restart???
48		060	000		finished read, now what?
49		061	000		Blank location, not used
50		062	000		Blank location, not used
51	TTYIN	063	103	INP	Input to look for start bit
52		064	044	NDI	AND with 001 to isolate TTY bit and set flags

Verified  
working  
05/02

Loader looks for NULLs followed by a "125" (Octal) to start. Self addressing loader:  
Next byte is Load start address LOW  
Following byte is Load address High  
Stop address is implied, when 16 consecutive NULLs are encountered

Loader will operate w/o punch routine  
Punch routine requires loader delay loops

Addresses shown are page 001

Highlights are addresses.

Input Port

53		065	001		
54		066	110	JFZ	Jump if not here yet TTYIN
55		067	063		L
56		070	001		H
57		071	106	CAL	Have start, Delay half bit TTYD2
58		072	150		L, Get in the center of the data bit
59		073	001		H
60		074	127	OUT3	Echo to TTY
61		075	250	XRA	Clear Accum
62		076	310	LBA	Clear B for temp storage
63		077	046	LEI	Set bit counter to 8 bits
64		100	010		
65	CONTINUE	101	106	CAL	Delay 1 bit TTYD1
66		102	140		L
67		103	001		H
68		104	103	INP	Input a bit
69		105	044	NDI	Mask off unused bits
70		106	001		
71		107	127	OUT3	Echo to TTY
72		110	032	RAR	Save bit in the carry flag
73		111	301	LAB	Get previous results
74		112	032	RAR	Combine them and prepare for next bit
75		113	310	LBA	Save results
76		114	041	DCE	Decrement bit counter
77		115	110	JFZ	Jump if not zero CONTINUE
78		116	101		L
79		117	001		H
80		120	340	LEA	Move A to E
81		121	006	LAI	Set up stop bit
82		122	001		
83		123	127	OUT3	Send stop bit
84		124	106	CAL	Delay 1 bit time TTYD1
85		125	140		L
86		126	001		H
87		127	106	CAL	Delay half bit TTYD2
88		130	150		L Compensate for half bit up front
89		131	001		H
90		132	304	LAE	Restore Accum
91		133	007	RET	Return
92		134	000		Space for possible instructions
93		135	000		to strip or add parity bit
94		136	000		
95		137	000		
96	TTYD1	140	036	LDI	Load D with delay
97		141	167		9 ms
98	ST	142	030	IND	Increment D
99		143	110	JFZ	Jump not zero ST
100		144	142		L
101		145	001		H
102		146	007	RET	Return
103		147	000		Blank location, not used
104	TTYD2	150	036	LDI	Load D with delay
105		151	273		4.5 ms
106	ST2	152	030	IND	Increment D
107		153	110	JFZ	Jump not zero ST2
108		154	152		L
109		155	001		H
110		156	007	RET	Return
111		157	000		Blank location, not used
112	PUNCHBIN	160	010	INB	Set end page to end +1

**Output Port**

**Input Port**

**Output Port**

**Output Port**

**Output Port**

**PUNCH Binary Tape**

113		216	106	CAL	Call NULLOUT
114		162	226		
115		163	001		
116		164	006	LAI	Load A with
117		165	125		Start Character
118		166	106	CAL	Call TTYOUT
119		167	243		
120		170	001		
121		171	306	LAL	Load A with L, start low addr
122		172	106	CAL	Call TTYOUT
123		173	243		
124		174	001		
125		175	305	LAH	Load A with H, start addr high
126		176	106	CAL	Call TTYOUT
127		177	243		
128		200	001		
129	PUNCH	201	307	LAM	load A, at HL
130		202	106	CAL	Call TTYOUT
131		203	243		
132		204	001		
133		205	060	INL	inc L
134		206	110	JFZ	jump not zero PUNCH
135		207	201		
136		210	001		
137		211	050	ICH	inc H
138		212	300	NOP	can't remember why I put this here.
139	end page?	213	301	LAB	Load a with B, end page address
140		214	275	CPH	compare a & h
141		215	110	JFZ	jump not zero PUNCH
142		216	201		
143		217	001		
144		220	106	CAL	Call NULLOUT
145		221	226		
146		222	001		
147		223	377	HLT	Halt
148		224	000		finished with the punch
149		225	000		now what?
150	NULLOUT	226	250	XRA	Clear A
151		227	026	LCI	Load C with
152		230	070		32 NULLs
153	SO	231	106	CAL	Call TTYOUT
154		232	243		
155		233	001		
156		234	021	DCC	Decrement C
157		235	110	JFZ	jump not zero SO
158		236	231		
159		237	001		
160		240	007	RET	Return
161	SPACE	241	006	LAI	Load A with
162		242	240		a space
163	TTYOUT	243	240	NDA	Clear Carry Bit
164		244	022	RAL	Set for Start Bit
165		245	127	OUT3	Output start bit
166		246	032	RAR	Restore Accum
167		247	106	CAL	Delay 1 bit time TTYD1
168		250	140		L
169		251	001		H
170		252	046	LEI	Load E with bit count
171		253	010		
172	BITOUT	254	127	OUT3	Send bit

Routine is called with start addr in H,L registers; B holds last page to be punched. This routine uses or changes all registers. Self addressing, Binary read will load data to same memory locations.

maybe add an auto stop when some number of NULLs are encountered?

TTY expects data in A, uses D and E

**Output Port**

**Output Port**

173		255	012	RRC	Set up for next bit
174		256	106	CAL	Delay 1 bit time TTYD1
175		257	140		L
176		260	001		H
177		261	041	DCE	Decrement bit count
178		262	110	JFZ	Jump not zero BITOUT
179		263	254		L
180		264	001		H
181	STOPBITS	265	340	LEA	Move A to E
182		266	006	LAI	Set up stop bit
183		267	001		
184		270	127	OUT3	Send stop bit
185		271	106	CAL	Delay 1 bit time TTYD1
186		272	140		L
187		273	001		H
188		274	106	CAL	Delay 1 bit time TTYD1
189		275	140		L
190		276	001		H
191		277	304	LAE	Restore Accum
192		300	007	RET	Return
193		301			
194		302			
195		303			
196		304			
197		305			
198		306			
199		307			
200		310			
201		311			
202		312			
203		313			
204		314			
205		315			
206		316			
207		317			
208		320			
209		321			
210		322			
211		323			
212		324			
213		325			
214		326			
215		327			
216		330			
217		331			
218		332			
219		333			
220		334			
221		335			
222		336			
223		337			
224		340			

**Output Port**