Parallel interface tester for keyboards

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http://www.esocop.org

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Introduction

Keyboards with parallel interfaces have been used a lot, until the advent of IBM PCs.

From the introduction of the first standards, the electronic designers preferred to focus on serial interfaces that were simpler and required less connection cables.

We, who enjoy vintage computers, still need to find and connect keyboards with a parallel interface; to check whether it works correctly or not there aren't any specific tools nor it is easy to verify the codes sent through the parallel interface.

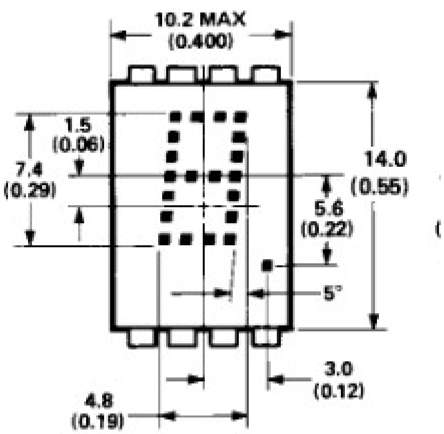
So I created a little tool that let me easily recognize datas exiting from the keyboard, using only materials I already had available in the lab.

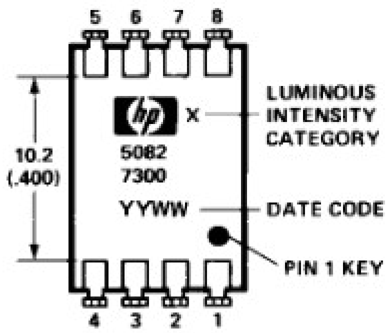
The circuit

The circuit is based on HP 5082-7300 numerical indicators, already present in laboratory.

Unfortunately, these indicators are not hexadecimal (the hex model is HP 5082-7340), so I limited myself to 3 bits for each one obtaining an octal encoding, and for my test purposes they were still fine; all I needed it was only a table for octal->ASCII encoding.

5082-7300





Pin	Function	
	5082-7300 and 7302 Numeric	5082-7340 Hexadecimal
1	Input 2	Input 2
2	Input 4	Input 4
3	Input 8	Input 8
4	Decimal Point	Blanking Control
5	Latch Enable	Latch Enable
6	Ground	Ground
7	V_{CC}	V_{CC}
8	Input 1	Input 1

Notes:

1. Dimensions in millimeters and (inches).
2. Unless otherwise specified, the tolerance on all dimensions is ±0.38 mm (± 0.015 inch).
3. Digit center line is ±0.25 mm (±0.01 inch) from package center line.

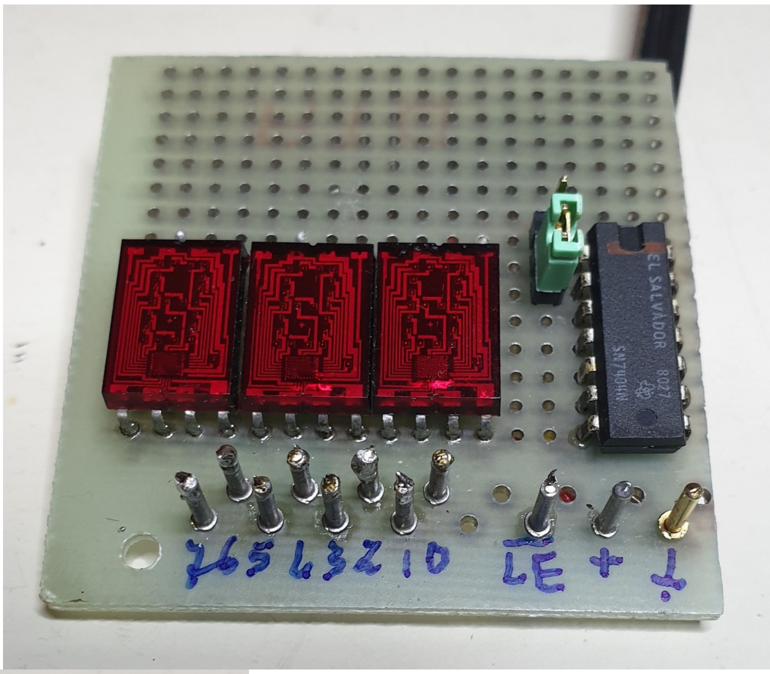
TRUTH TABLE					
BCD DATA[1]				5082-7300/7302	5082-7340
X_8	X_4	X_2	X_1		
L	L	L	L	0	0
L	L	L	H	1	1
L	L	H	L	2	2
L	L	H	H	3	3
L	H	L	L	4	4
L	H	L	H	5	5
L	H	H	L	6	6
L	H	H	H	7	7
H	L	L	L	8	8
H	L	L	H	9	9
H	L	H	L	A	A
H	L	H	H	(BLANK)	B
H	H	L	L	(BLANK)	C
H	H	L	H	-	D
H	H	H	L	(BLANK)	E
H	H	H	H	(BLANK)	F
DECIMAL PT.[2]			ON		V_{DP} = L
			OFF		V_{DP} = H
ENABLE[1]			LOAD DATA		V_E = L
			LATCH DATA		V_E = H
BLANKING[3]			DISPLAY-ON		V_B = L
			DISPLAY-OFF		V_B = H

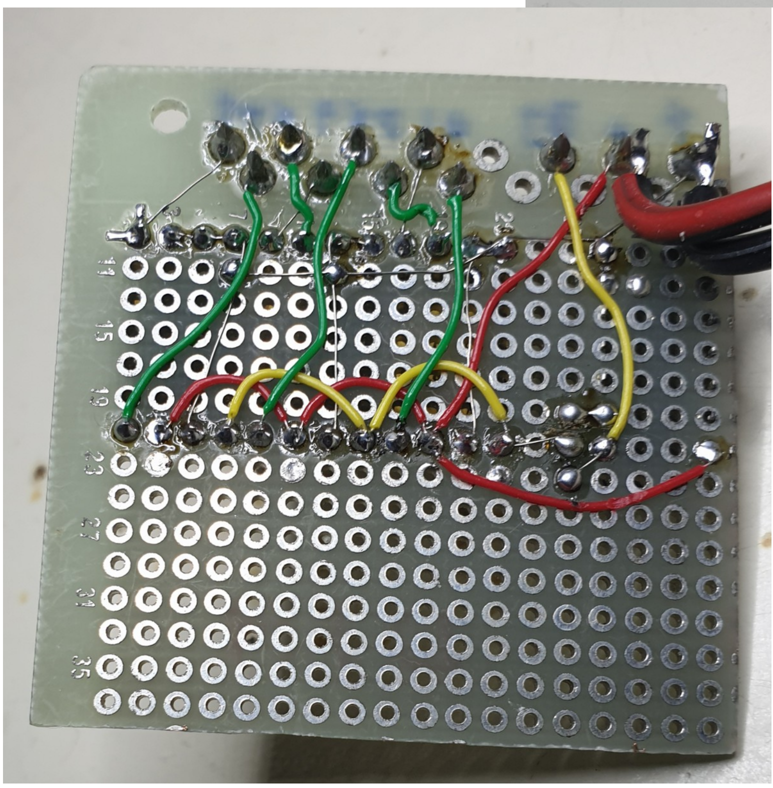
Notes:

1. H = Logic High; L = Logic Low. With the enable input at logic high changes in BCD input logic levels or D.P. input have no effect upon display memory, displayed character, or D.P.
2. The decimal point input, DP, pertains only to the 5082-7300 and 5082-7302 displays.
3. The blanking control input, B, pertains only to the 5082-7340 hexadecimal display. Blanking input has no effect upon display memory.

With these informations the circuit had been easy to be assembled even without any schematics, I used green wires for data, red for power +5V, yellow for latch enable signals.

The the only particular note is given by the latch enable signal which, in some cases, must be inverted, for this reason I added a TTL 7404 and a jumper.



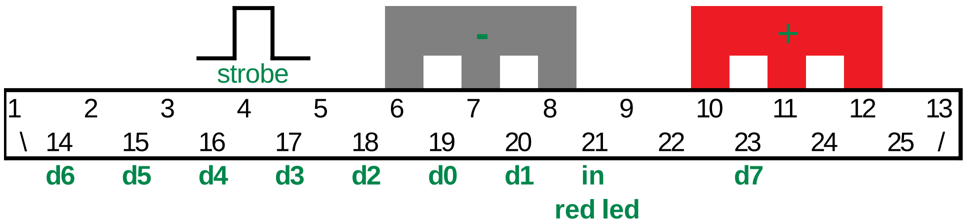


Reverse engineering of a keyboard

To test the circuit I used an old Honeywell keyboard, to retrieve the correct pin connection I simply opened the case to check where wires were connected.

For this keyboard the wire were arranged as follow:

Honeywell keyboard pin connection



and these are the results: