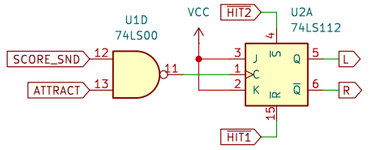
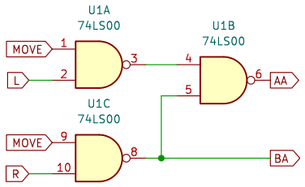
The 7474 that was originally here (used as a toggle) has been replaced with a 74LS112 to reduce the IC count.

The only change that had to be made to the surrounding circuitry was the removal of the inverter on the clock input. The 74x74 updates on the rising clock edge, while the 74x112 updates on the falling edge.





	BA	AA	Full dec. value
Impossible state	0	0	136
Move left (1 pixel)	0	1	137
Don't move	1	0	138
Move right (1 pixel)	1	1	139

It seems that the problem is caused by the horizontal counter counting one place more than it's supposed to.

This results in the ball moving to the right one place more than it should.

When the system is first switched on, this seems to occur on every frame. The frequency of this goes down over time.

Initially, this will be visible as the ball either:

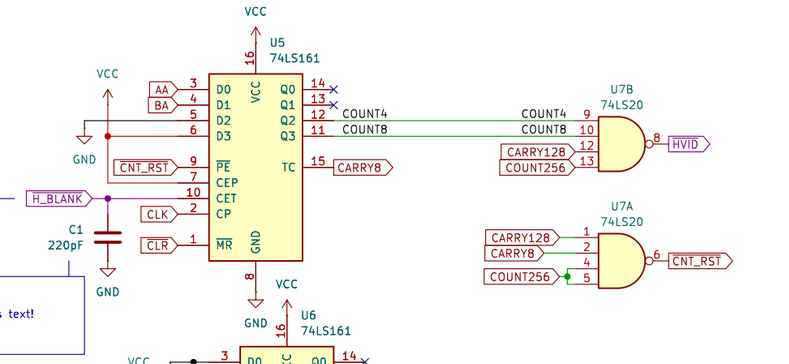
- Staying in one place when it should be moving left.
- Moving to the right too quickly. (Theoretically. This is never seen initially, since the system initializes with the ball trying to move left)

After a couple minutes, this issue almost completely disappears for some reason. In the gradual transition to this state, the ball can be seen "jittering" to the right once every few seconds.

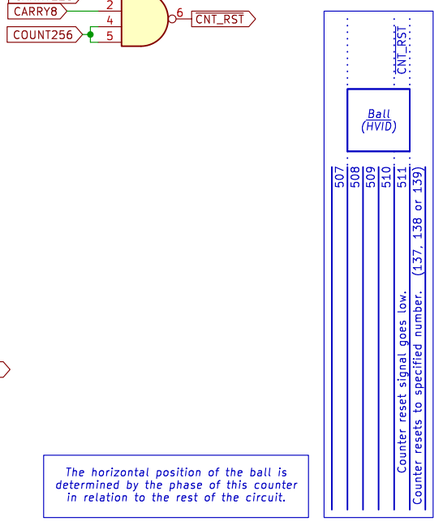
All this suggests the problem may be somehow temperature-based.

Horizontal count is inhibited while horizontal blanking region is drawn (every scanline).

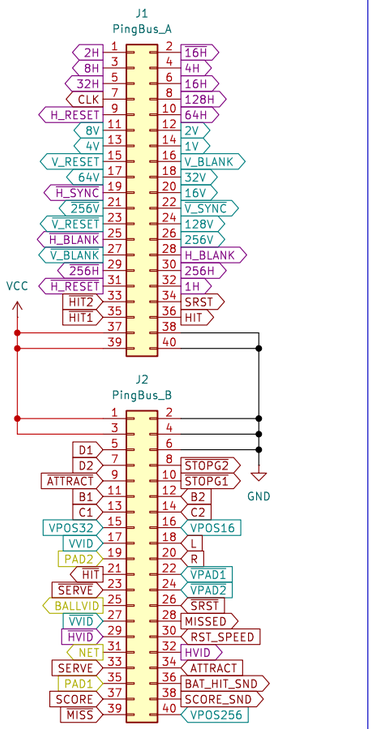
Change this text!



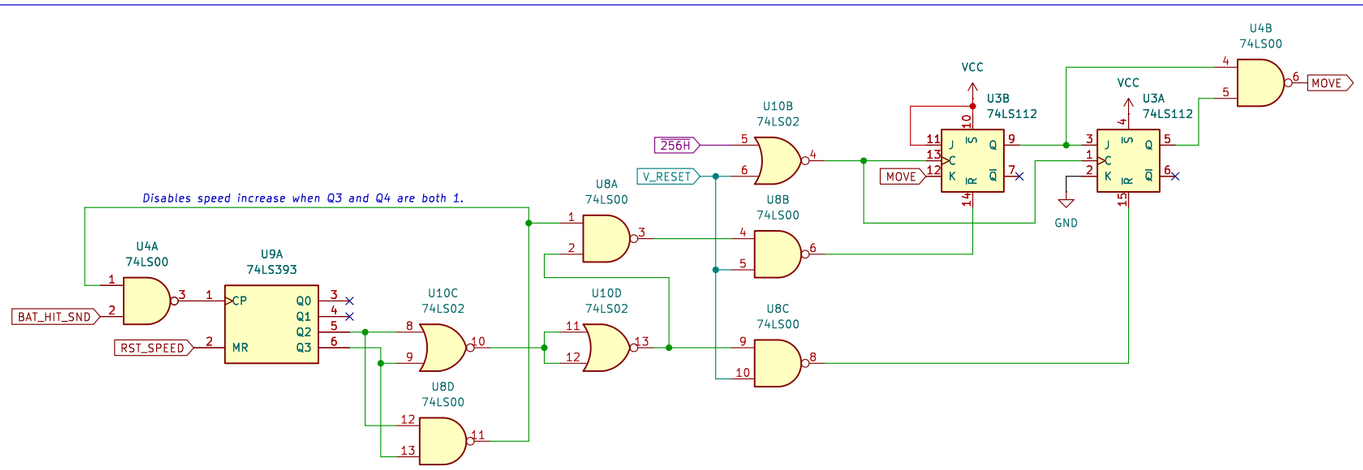
During play, the horizontal counter will be set to

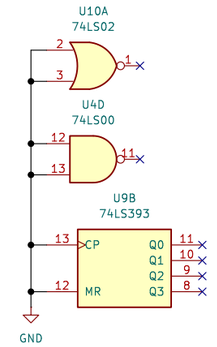


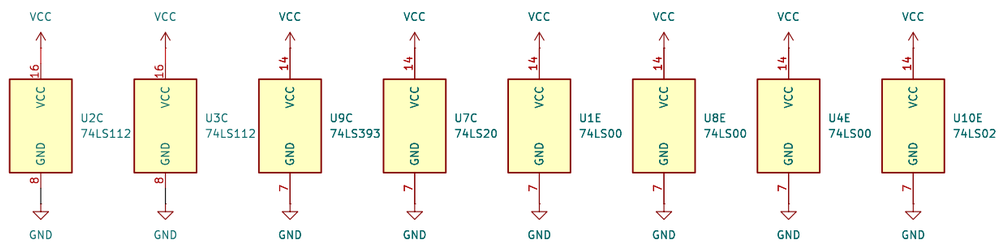
The horizontal position of the ball is determined by the phase of this counter in relation to the rest of the circuit.

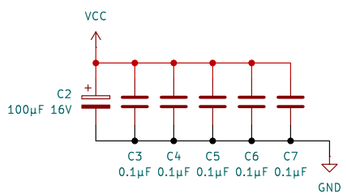


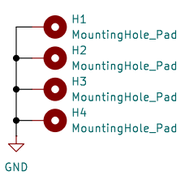
Disables speed increase when Q3 and Q4 are both 1.











Original circuit designed by Allan Alcorn.
Circuit improvements by Dr. Hugo R. Holden.
PCB designed by Alex J. Lowry.

Alex J. Lowry (alex-j-lowry.github.io)

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Title: Modular Ping (Horizontal Ball)

Size: A3	Date: 2025-07-25	**Rev: 1**
KiCad E.D.A. 9.0.0		Id: 1/1