Abstract Submitted
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Digital Wires BENNY BROWN, UC Davis, ALFRED HUBLER, UIUC — We study hardware implementations of cellular automata as reliable, adjustable, and secure commication lines. We discuss energy efficient digital wires on a nano-scale, all-optical digital wires, and digital wires as power lines and present performance data of a prototype digital wire, a six cells wide and ten cells long Boolean network. We show that digital wires have the following advantages: (i) Fixed pulse shape (pulses have a rectangular shape with a constant height and a constant width and produce no echos); (ii) Robust against electric smog. Digital wires based on semiconductor technology are effectively inert against electro-magnetic radiation, except for low-frequency radiation (heat) and high frequency radiation (X-rays). Digital wires based on plasma technology have in addition a very high tolerance for heat and X-rays. In digital wire the pulse speed can be rapidly adjusted. Signals on digital wires can be encrypted. Some digital wires can be used as general purpose computers. The data and the code are the input of the wire. Then both travel along the wire and 'collide'. The collision is the computation. The result travels to the end of the wire, for further processing, as parallel input by a CPU, an actuator, or another digital wire.

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