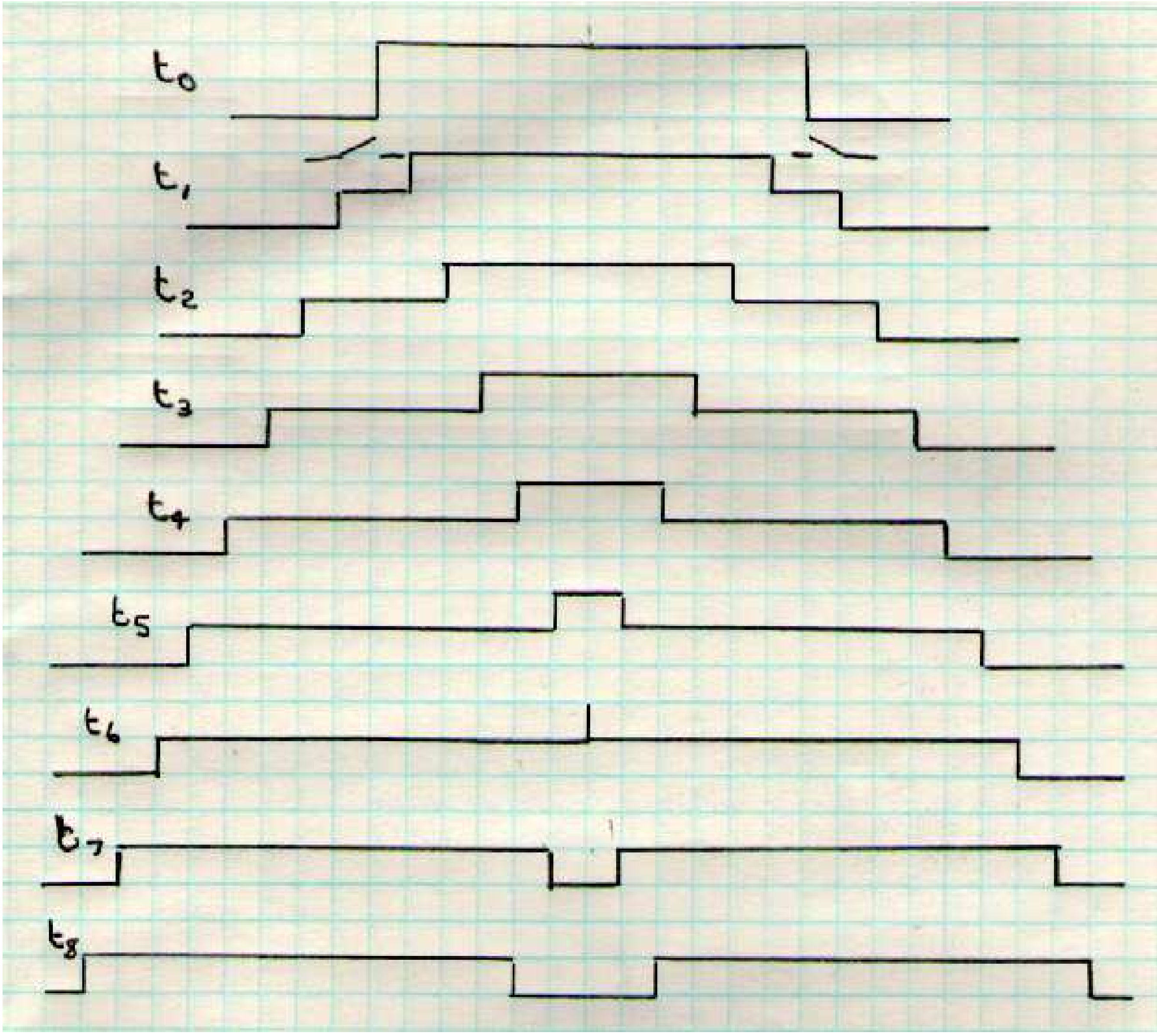
Wakefield 2.

At time t_0, two switches at each end connect the 12 nsec long piece of charged 50 Ω coaxial cable to two infinitely long 50 Ω cables. The oscilloscope traces, with horizontal time base, are here at http://www.ivorcatt.co.uk/x3a922.pdf . Below we deduce the situation each nanosecond inside the capacitor; snapshots with a horizontal distance axis.

If it is thought that a charged capacitor does not have a stationary electric field, but rather always has two TEM waves superposed, one travelling to the right and the other to the left, these snapshots are easy to understand. At t_o we have two energy currents superposed, one travelling to the right and one to the left. Reaching the end, they will reflect back and travel in the opposite direction in a continual dance.

When the switches are closed, there are no more reflections, and two 12nsec pulses exit, one to the right and the other to the left.



The difficulty arises if we try to keep to classical theory, that a charged capacitor has a stationary electric field. In particular, look at t_5, t_6 and t_7. There is no instantaneous action at a distance, so the first information that the switches have closed reaches the central point at t_6. At that instant, stationary energy at the central point suddenly rushes off, half to the right and half to the left, at the speed of light. Under classical theory, that the energy in the capacitor was stationary, and still stationary at the central point until t_6, what is the explanation?

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