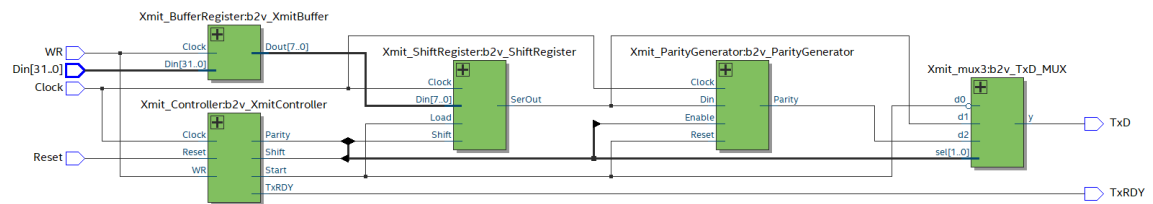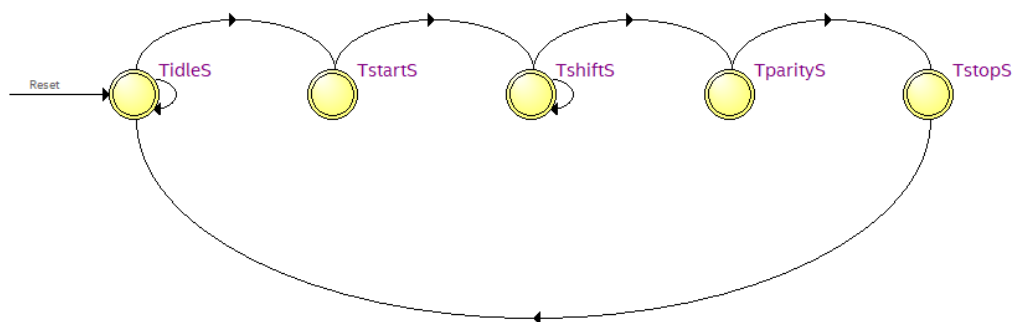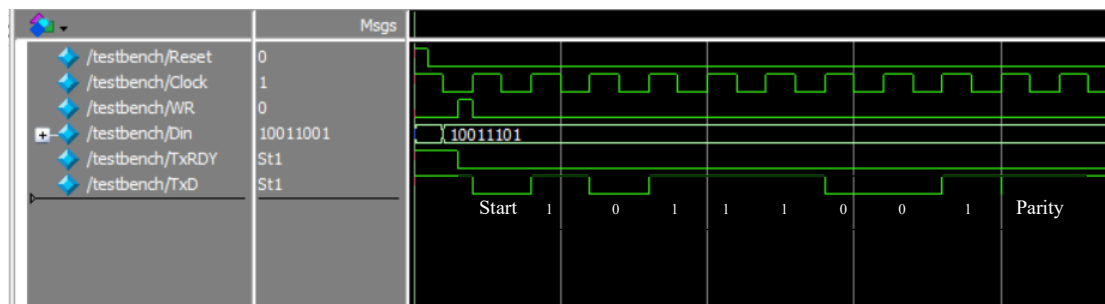Synthesized Schematic:

Controller's FSM

Testbench Result for odd number of 1's:

Testbench Result for even number of 1's: