Patterns

- Functional
  - 1,112,583 received data and 3,499,997 transmitted data
- Stuck at
  - 33 patterns (2108 test cycles)
- Transition delay
  - 40 patterns (2702 test cycles)
- Path delay
  - 9 patterns (434 test cycles)

RS232-T1200

Trojan Description

- Trojan trigger is a sequential comparator whose trigger input probability is 5.00e-11. Whenever Trojan gets triggered, its payload gains control over xmit_doneH primary output signal.

Trojan Taxonomy

- Insertion phase: Design
- Abstraction level: Gate-level
- Activation mechanism: Internally conditionally triggered
- Effects: Change functionality
- Physical characteristics: Functional

```
SDFFSRX1 iDatasend_reg_1 ( .D(iXMIT_N27), .SI(iXMIT_bitCell_cntrH_0_), .SE(test_se), .CK(sys_clk), .SN(1'b1), .RN(n264), .Q(n400) );
SDFFSRX1 iDatasend_reg_2 ( .D(n190), .SI(iXMIT_state_2_), .SE(test_se), .CK(sys_clk), .SN(1'b1), .RN(n266), .Q(n401));
SDFFSRX1 iDatasend_reg_3 ( .D(uart_REC_dataH), .SI(iRECEIVER_rec_datH), .SE(test_se), .CK(sys_clk), .SN(n266), .RN(1'b1),.Q(n402) );
SDFFSRX1 iDatasend_reg_4 ( .D(iRECEIVER_rec_datSyncH), .SI(rec_dataH_rec[7]), .SE(test_se), .CK(sys_clk), .SN(n266), .RN(1'b1),.Q(n403));
NAND4X1 U292(.A(iXMIT_next_state_2_),.B(iXMIT_state_0_),.C(iXMIT_state_1_),.D(iXMIT_state_2_),.Y(iXMIT_state_CTRL));
NAND4X1 U293(.A(iXMIT_N46),.B(iXMIT_N45),.C(iXMIT_N44),.D(iXMIT_N29),.Y(iXMIT_N_CTRL_1_));
NAND4X1 U294(.A(iXMIT_N28),.B(iXMIT_N27),.C(iXMIT_N26),.D(iXMIT_N25),.Y(iXMIT_N_CTRL_2_));
NAND4X1 U295(.A(iXMIT_N24),.B(iXMIT_xmit_ShiftRegH_7_),.C(iXMIT_xmit_ShiftRegH_6_),.D(iXMIT_xmit_ShiftRegH_5_),.Y(iXMIT_xmit_CTRL));
OR4X1   U296(.A(iXMIT_state_CTRL),.B(iXMIT_N_CTRL_1_),.C(iXMIT_N_CTRL_2_),.D(iXMIT_xmit_CTRL),.Y(iXMIT_CRTL));
NAND4X1 U297(.A(iRECEIVER_next_state_2_),.B(iRECEIVER_state_0_),.C(iRECEIVER_state_1_),.D(iRECEIVER_state_2_),.Y(iRECEIVER_state_CTRL));
NAND4X1 U300(.A(n400),.B(n401),.C(n402),.D(n403),.Y(iRECEIVER_bitCell_CTRL));
OR2X1   U301(.A(iRECEIVER_state_CTRL), .B(iRECEIVER_bitCell_CTRL), .Y(iRECEIVER_CTRL));
OR2X1   U302(.A(iXMIT_CRTL),.B(iRECEIVER_CTRL),.Y(iCTRL));
AND2X1  U303(.A(iCTRL),.B(xmit_doneH_temp),.Y(xmit_doneH));
```

RS232-T1200

Functional

Trojan activation probability	The number of Transmitted	The number of Received	Trojan activation	Payload Change	Simulation Length (No. Clock)	Length of each Receive/Transmission
5.00e-11	3 499 997	1 112 583	0	0	168 000 000	176/150

Structural

Circuit activity in Trojan-free	Circuit activity in Trojan-inserted	Trojan inputs activity	Activity inTrojan circuit	Trojan Triggered	Payloadchanged	Stuck-at unmatched
70 667	73 423	12 979	1 574	0	394	0

Transition delay

Circuit activity in Trojan-free	Circuit activity in Trojan-inserted	Trojan inputs activity	Activity inTrojan circuit	Trojan Triggered	Payloadchanged	Transition unmatched
94 436	98 245	17 268	2 200	0	537	0

Path delay

Circuit activity in Trojan-free	Circuit activity in Trojan-inserted	Trojan inputs activity	Activity inTrojan circuit	Trojan Triggered	Payloadchanged	Transition unmatched
35 963	37 477	6 123	932	0	194	0