

# Assertions-slathar

I've designed my runTestBench to send pre-determined test vectors so as to have a more controlled testing base. Before every new test vector I signal the assertions as to if I've inserted a fault in the test vector and if the fault is not reported or echoed by the calculator, the assertion prints an error.

Several things could go wrong in a RPN calculator. While designing the test bench I focused my development around the following ideas:

- One of the several errors may not be asserted when required.
- The calculator may not follow the protocol correctly.
- Data overflow could be handled poorly.
- Some of the values may not appear on the stack on time.
- The stack could be bigger than designed.
- Some non-error flags may not be asserted when required.
- One element operations like 'negate' and 'and' could be carried out wrong.
- The ordering of two element operations like sub and swap could be flipped.

PHASE	FAULT(s) FOUND
1	The START payload doesn't appear on time at stack[0]; unexpectedDone doesn't assert.
2	protocolError isn't asserted for two starts in a row without done.
3	No faults found
4	Doesn't assert correct sometimes; messes swap operation.
5	Doesn't assert correct; stackOverflow isn't asserted;
6	Asserts correct on when there is an error; Doesn't assert dataOverflow; protocolError isn't asserted; messes negate/and operation.
7	More than two add and sub offsets the results by 16'h0002.
8	The sub results are 16'h0001 greater than they should be.
9	No faults found
10	Doesn't give protocolError.