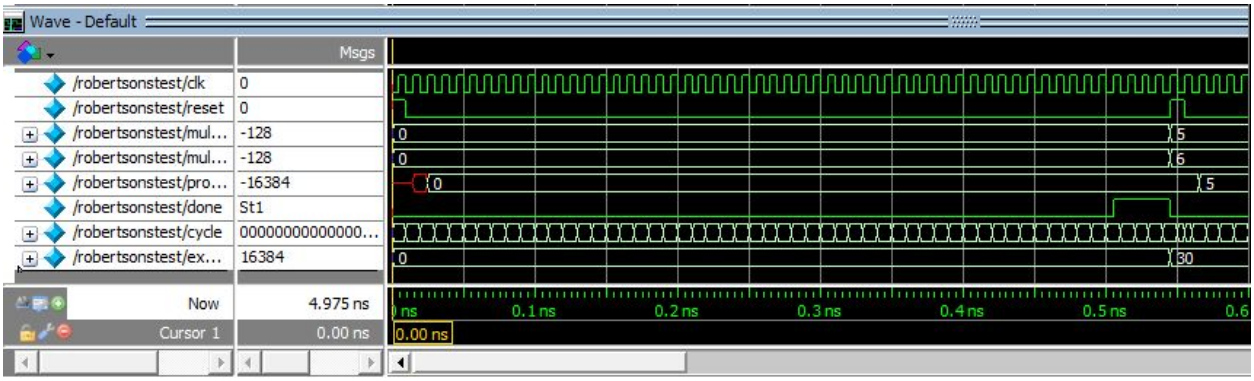
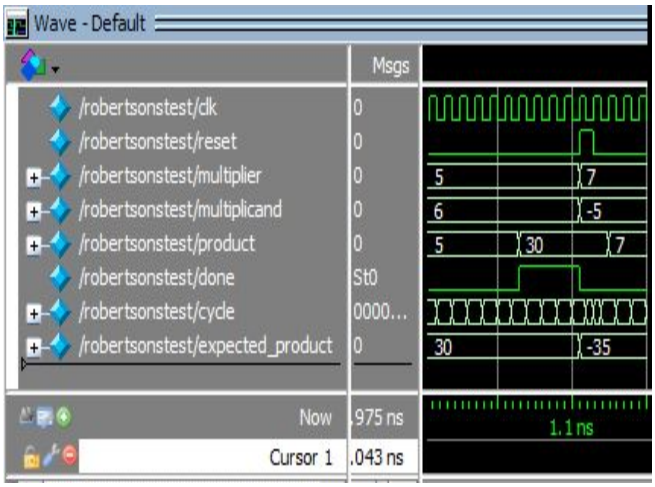
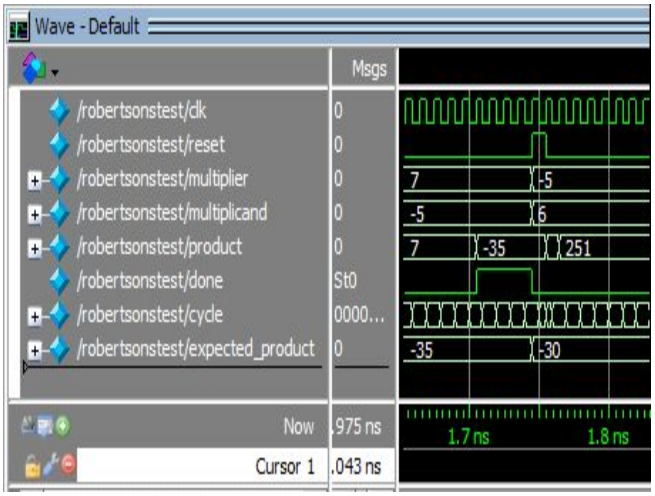
2a.

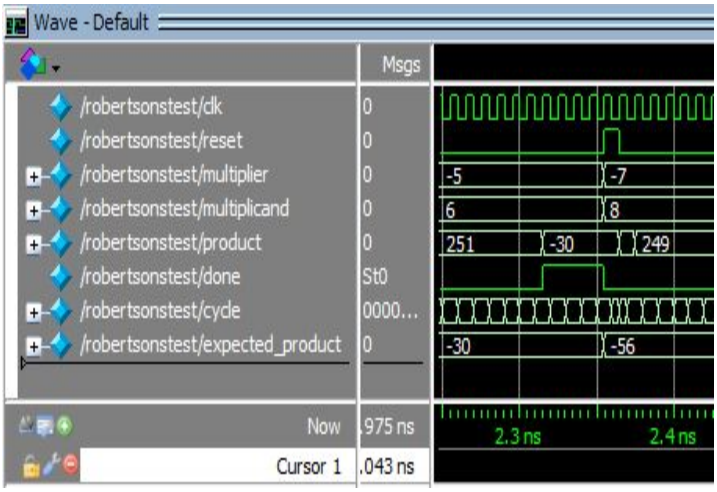
2b. There were no Errors or Warnings

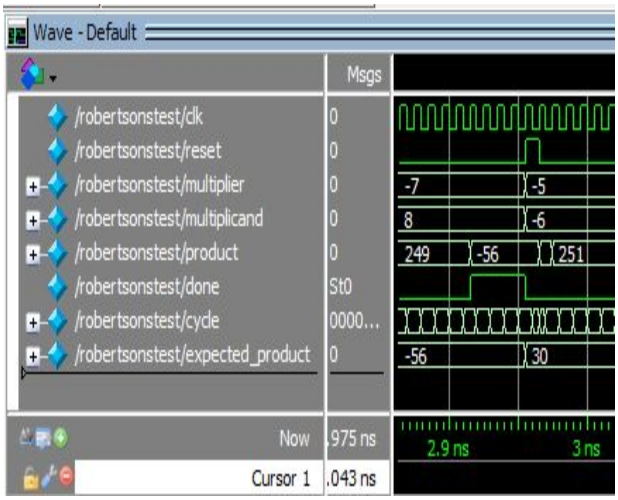
3.

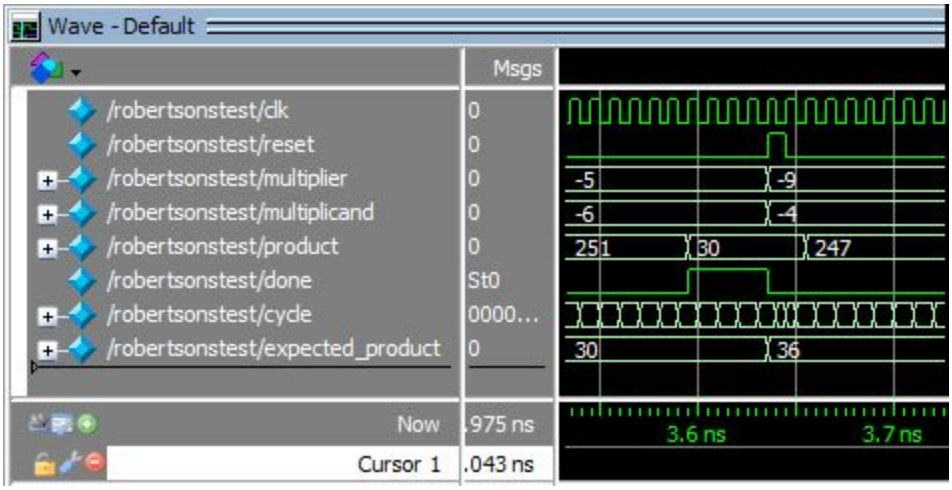

Wave - Default
Msgs
/robertsonstest/clk
/robertsonstest/reset
/robertsonstest/mul...
/robertsonstest/mul...
/robertsonstest/pro...
/robertsonstest/done
/robertsonstest/cycle
/robertsonstest/ex...
Now
4.975 ns
Cursor 1
0.00 ns
0.1 ns
0.2 ns
0.3 ns
0.4 ns
0.5 ns

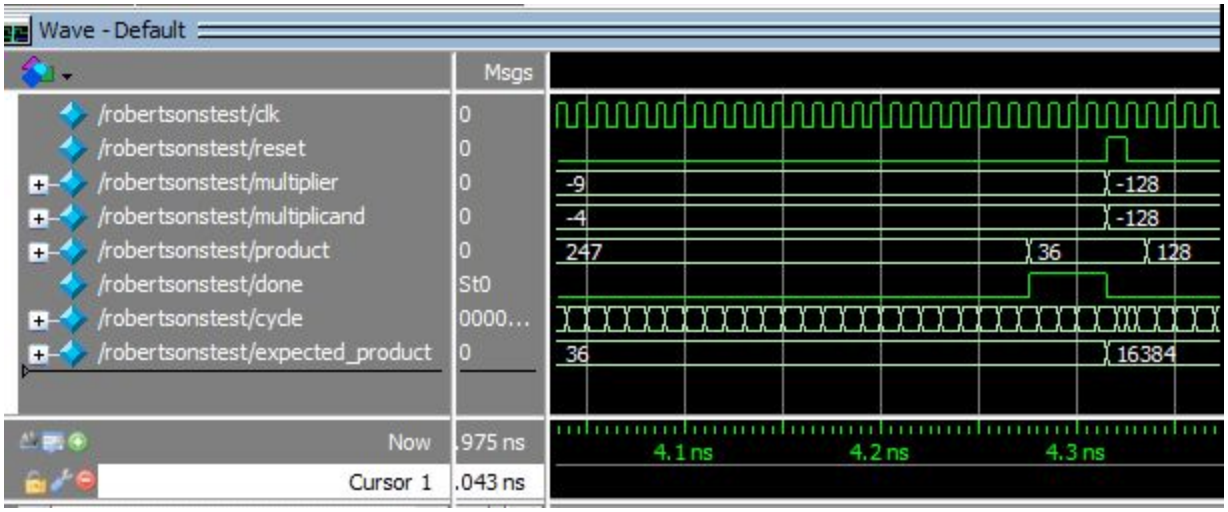

Wave - Default
Msgs
/robertsonstest/clk
/robertsonstest/reset
/robertsonstest/multiplier
/robertsonstest/multiplicand
/robertsonstest/product
/robertsonstest/done
/robertsonstest/cycle
/robertsonstest/expected_product
Now
Cursor 1
1.1 ns

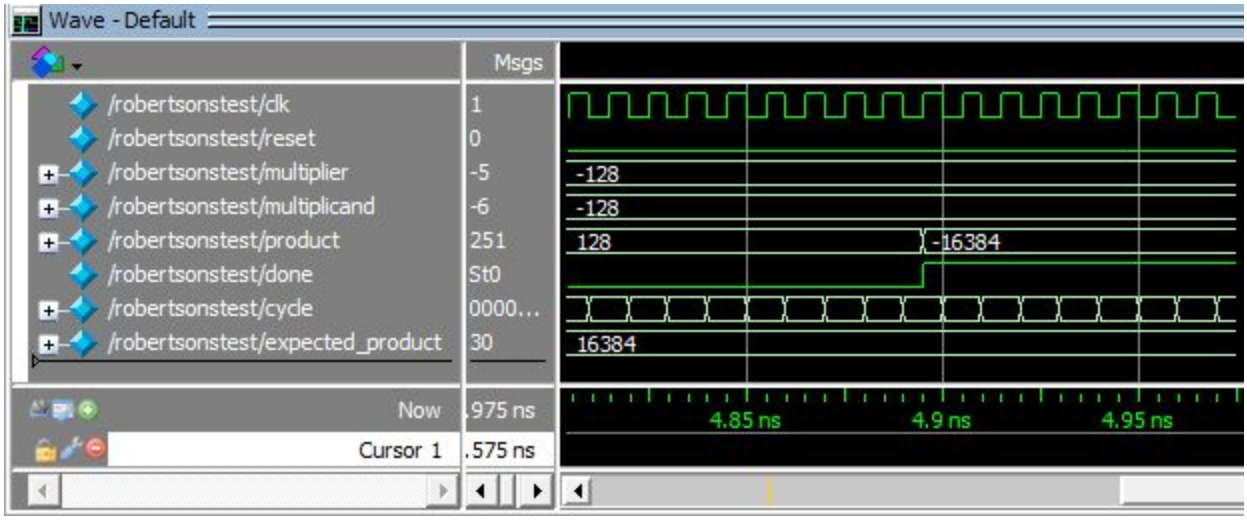

Wave - Default
Msgs
/robertsonstest/clk
/robertsonstest/reset
/robertsonstest/multiplier
/robertsonstest/multiplicand
/robertsonstest/product
/robertsonstest/done
/robertsonstest/cycle
/robertsonstest/expected_product
Now
Cursor 1
1.7 ns
1.8 ns


Wave - Default
Msgs
/robertsonstest/clk
/robertsonstest/reset
/robertsonstest/multiplier
/robertsonstest/multiplicand
/robertsonstest/product
/robertsonstest/done
/robertsonstest/cycle
/robertsonstest/expected_product
Now
Cursor 1
2.3 ns
2.4 ns

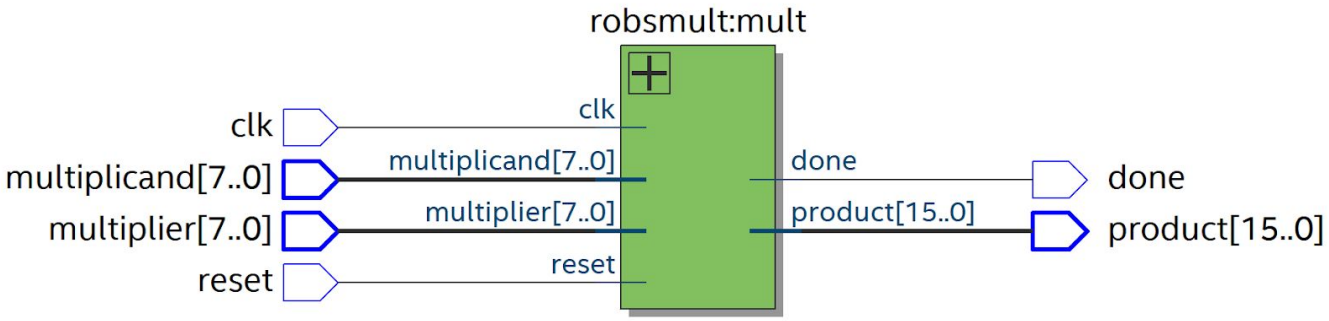

Wave - Default
Msgs
/robertsonstest/clk
/robertsonstest/reset
/robertsonstest/multiplier
/robertsonstest/multiplicand
/robertsonstest/product
/robertsonstest/done
/robertsonstest/cycle
/robertsonstest/expected_product
Now
Cursor 1
2.9 ns
3 ns


Wave - Default
Msgs
/robertsonstest/clk
/robertsonstest/reset
/robertsonstest/multiplier
/robertsonstest/multiplicand
/robertsonstest/product
/robertsonstest/done
/robertsonstest/cycle
/robertsonstest/expected_product
0
0
0
0
0
St0
0000...
0
-5
-9
-6
-4
251
30
247
30
36
Now
975 ns
Cursor 1
.043 ns
3.6 ns
3.7 ns

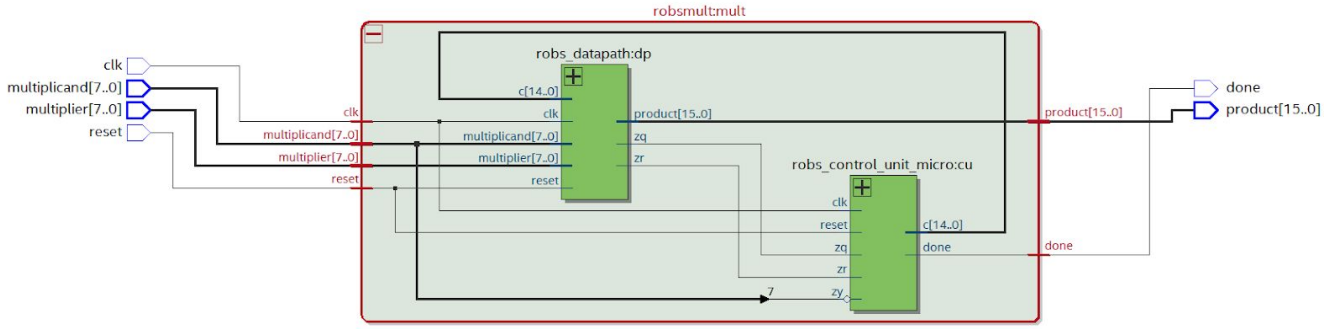

Wave - Default
Msgs
/robertsonstest/clk
/robertsonstest/reset
/robertsonstest/multiplier
/robertsonstest/multiplicand
/robertsonstest/product
/robertsonstest/done
/robertsonstest/cycle
/robertsonstest/expected_product
0
0
0
0
0
St0
0000...
0
-9
-128
-4
-128
247
36
128
36
16384
Now
975 ns
Cursor 1
.043 ns
4.1 ns
4.2 ns
4.3 ns


Wave - Default
Msgs
/robertsonstest/clk
/robertsonstest/reset
/robertsonstest/multiplier
/robertsonstest/multiplicand
/robertsonstest/product
/robertsonstest/done
/robertsonstest/cycle
/robertsonstest/expected_product
1
0
-5
-6
251
St0
0000...
30
-128
-128
128
-16384
16384
Now
975 ns
Cursor 1
.575 ns
4.85 ns
4.9 ns
4.95 ns

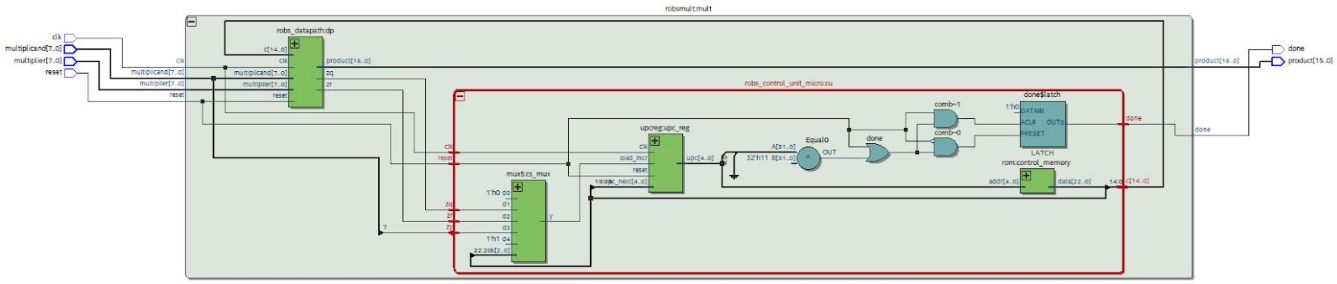
4a.


robsmult:mult
clk
multiplicand[7..0]
multiplier[7..0]
reset
clk
multiplicand[7..0]
multiplier[7..0]
reset
done
product[15..0]
done
product[15..0]

4b.


robsmult:mult
clk
multiplicand[7..0]
multiplier[7..0]
reset
robs_datapath:dp
c[14..0]
clk
multiplicand[7..0]
multiplier[7..0]
reset
product[15..0]
zq
zr
robs_control_unit_micro:cu
clk
reset
zq
zr
zy
c[14..0]
done
7
product[15..0]
done
done
product[15..0]

4c.


robsmult:mult
robs_datapath:dp
robs_control_unit_micro:cu
upcreg:upc_reg
Equal0
done$latch
rom:control_memory
muxtics_mux
done
product[15..0]

5.1
Simulation failed c000 != 4000 = 80 * 80

5.2
There were no Warnings in the Transcript

5.3
Warning (18236): Number of processors has not been specified which may cause overloading on shared machines. Set the global assignment NUM_PARALLEL_PROCESSORS in your QSF to an appropriate value for best performance.
Warning (10230): Verilog HDL assignment warning at upc_reg.sv(24): truncated value with size 32 to match size of target (5)
Warning (10030): Net "mem.data_a" at rom.sv(7) has no driver or initial value, using a default initial value '0'
Warning (10030): Net "mem.waddr_a" at rom.sv(7) has no driver or initial value, using a default initial value '0'
Warning (10030): Net "mem.we_a" at rom.sv(7) has no driver or initial value, using a default initial value '0'
Warning (10230): Verilog HDL assignment warning at counter_down.sv(18): truncated value with size 32 to match size of target (8)
Warning (10230): Verilog HDL assignment warning at counter_down.sv(26): truncated value with size 32 to match size of target (8)

No Errors in Quartus

5.4
The threshold for the bug seems to be around the -60’s when going through all of the multiplications of numbers between -66 and -62, the multiplier failed when the multiplier was 0xBF (-65) and the multiplicand was 0xBE (-65).