

irsim example: 16 bit ripple carry adder

```
| Auto-generated `sim' format netlist

| Instance `R' of component `Ripple'

p A Vdd R_Ripple_0N 2 4
p B R_Ripple_0N R_Ripple_1N 2 4
p A R_Ripple_1N R_Ripple_CBar 2 4
p B Vdd R_Ripple_0N 2 4
p Cin R_Ripple_0N R_Ripple_CBar 2 4
n Cin R_Ripple_CBar R_Ripple_2N 2 2
n A GND R_Ripple_2N 2 2
n B GND R_Ripple_2N 2 2
n A R_Ripple_CBar R_Ripple_3N 2 2
n B GND R_Ripple_3N 2 2
p Cin Vdd R_Ripple_4N 2 4
p A Vdd R_Ripple_4N 2 4
p B Vdd R_Ripple_4N 2 4
p R_Ripple_CBar R_Ripple_4N R_Ripple_SBar 2 4
p A R_Ripple_4N R_Ripple_5N 2 4
p B R_Ripple_5N R_Ripple_6N 2 4
p Cin R_Ripple_6N R_Ripple_SBar 2 4
n R_Ripple_CBar R_Ripple_SBar R_Ripple_7N 2 2
n A GND R_Ripple_7N 2 2
n B GND R_Ripple_7N 2 2
n Cin GND R_Ripple_7N 2 2
n Cin R_Ripple_8N R_Ripple_SBar 2 2
n A R_Ripple_9N R_Ripple_8N 2 2
n B GND R_Ripple_9N 2 2
p R_Ripple_CBar Vdd Cout 2 4
n R_Ripple_CBar GND Cout 2 2
p R_Ripple_SBar Vdd S 2 4
n R_Ripple_SBar GND S 2 2

| End of netlist
```

16 bit ripple carry adder: Test command file

```
vector S S{15:0}
vector A A{15:0}
vector B B{15:0}

analyzer Cout S B A Cin

w Cout S B A Cin

l Cin
set A 0000000000000000
set B 0000000000000000
s
set A 1111111111111111
s
h Cin
s
set B 1111111111111111
s
l Cin
set A 0000000000000000
l Cin
s
set A 1111111111111110
set B 1111111111111110
s
h Cin
s
set A 0111111111111111
set B 0111111111111111
s
l Cin
s
```

Define bit vectors for display

Turn on X-window analyzer display

Set bit vectors

16 bit ripple carry adder: Test run

```
16 > irsim add16.sim
*** IRSIM version 8.6 ***
259 nodes; transistors: n-channel=224 p-channel=224
parallel txtors:none
irsim> @ add16.test
A=0000000000000000 B=0000000000000000 S=0000000000000000 Cin=0 Cout=0
time = 100.0ns
A=1111111111111111 B=0000000000000000 S=1111111111111111 Cin=0 Cout=0
time = 200.0ns
A=1111111111111111 B=0000000000000000 S=0000000000000000 Cin=1 Cout=1
time = 300.0ns
A=1111111111111111 B=1111111111111111 S=1111111111111111 Cin=1 Cout=1
time = 400.0ns
A=0000000000000000 B=1111111111111111 S=1111111111111111 Cin=0 Cout=0
time = 500.0ns
A=1111111111111110 B=1111111111111110 S=1111111111111100 Cin=0 Cout=1
time = 600.0ns
A=1111111111111110 B=1111111111111110 S=1111111111111101 Cin=1 Cout=1
time = 700.0ns
A=0111111111111111 B=0111111111111111 S=1111111111111111 Cin=1 Cout=0
time = 800.0ns
A=0111111111111111 B=0111111111111111 S=1111111111111110 Cin=0 Cout=0
time = 900.0ns
irsim> q
17 >
```

Cout

S

B

A

Cin

time (ns)

fff

fff

ffe

ffe

7ff

ffe

7ff

600.0 650.0 700.0 750.0 800.0 850.0 900.0 950.0 1000.0