TSEK06
High-Level Design Report

Group 5

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Version P1B

Status

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Contents

Document history

Version	**Date**	**Changes**	**Performed by**
P1A	2016-02-15	First draft	Johan Isaksson

1 Introduction

2 Block Level Description

2.1 SPI/PSRBR

2.2 16-bit Kogge-Stone Adder

The Kogge-Stone adder consists of four simple blocks connected in a complex way. These four blocks can be seen in figure 1-4. The red block constitute the initial stage which takes two binary numbers A and B as input. The corresponding truth table is found in table 1. The output signals P and G generated from this block are later used by other blocks in the adder. The G, also called the Generate signal, trickles down through the hierarchy of yellow, and yellow carry blocks to finally end up in the sum block. The truth table for this block can be found in table 4. Truth tables for the yellow and yellow carry blocks are found in table 2 and 3.
Lägg till bild på hur blocken sitter ihop.

Table 1 – Logic table of red block.

A_i	B_i	$P = A_i \oplus B_i$	$G = A_i \wedge B_i$
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

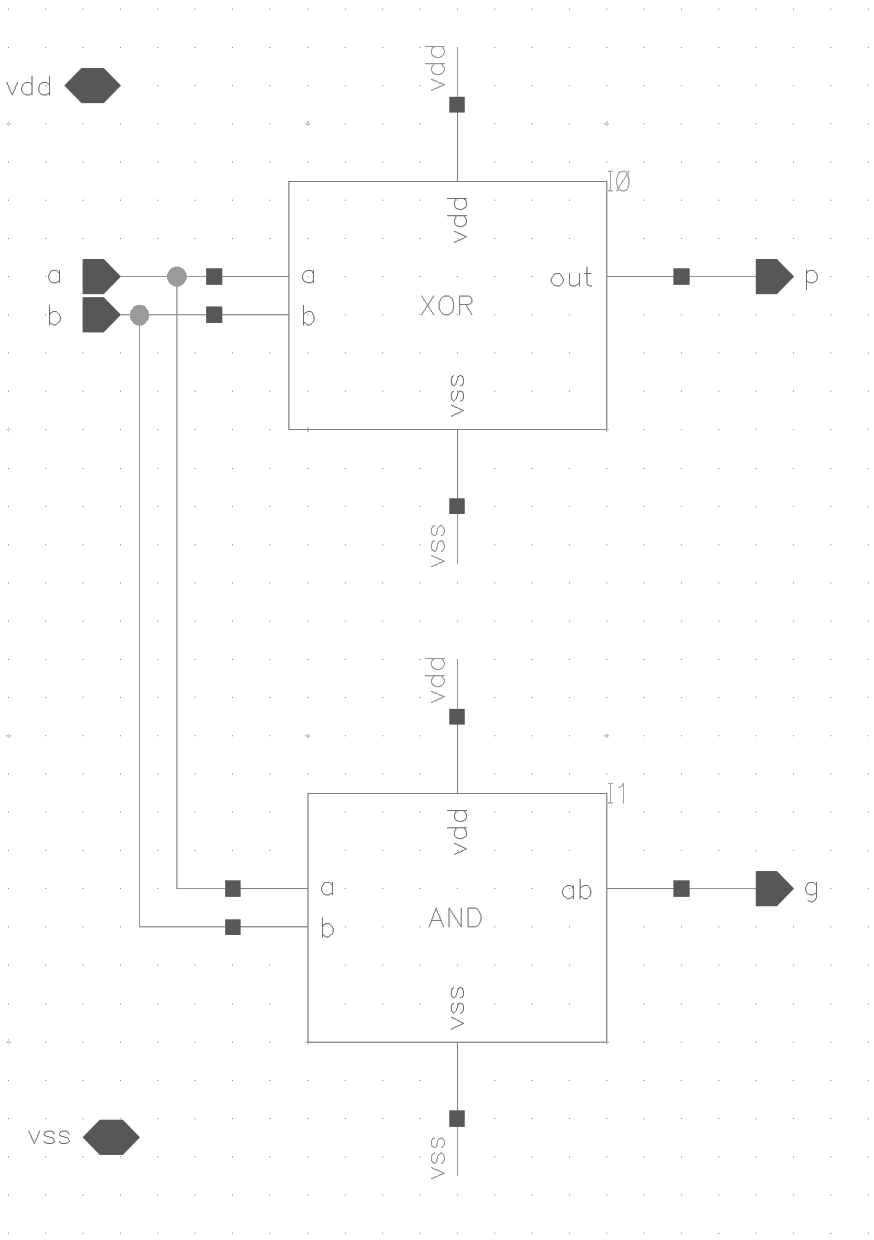

Figure 1 – Schematic view of the red block.

Table 2 – Logic table of yellow block.

G_i	$G_{i,prev}$	P_i	$P_{i,prev}$	$P = P_i \wedge P_{i,prev}$	$G = (P_i \wedge G_{i,prev}) \vee G_i$
0	0	0	0	0	0
0	0	0	1	0	0
0	0	1	0	0	0
0	0	1	1	1	0
0	1	0	0	0	0
0	1	0	1	0	0
0	1	1	0	0	1
0	1	1	1	1	1
1	0	0	0	0	1
1	0	0	1	0	1
1	0	1	0	0	1
1	0	1	1	1	1
1	1	0	0	0	1
1	1	0	1	0	1
1	1	1	0	0	1
1	1	1	1	1	1

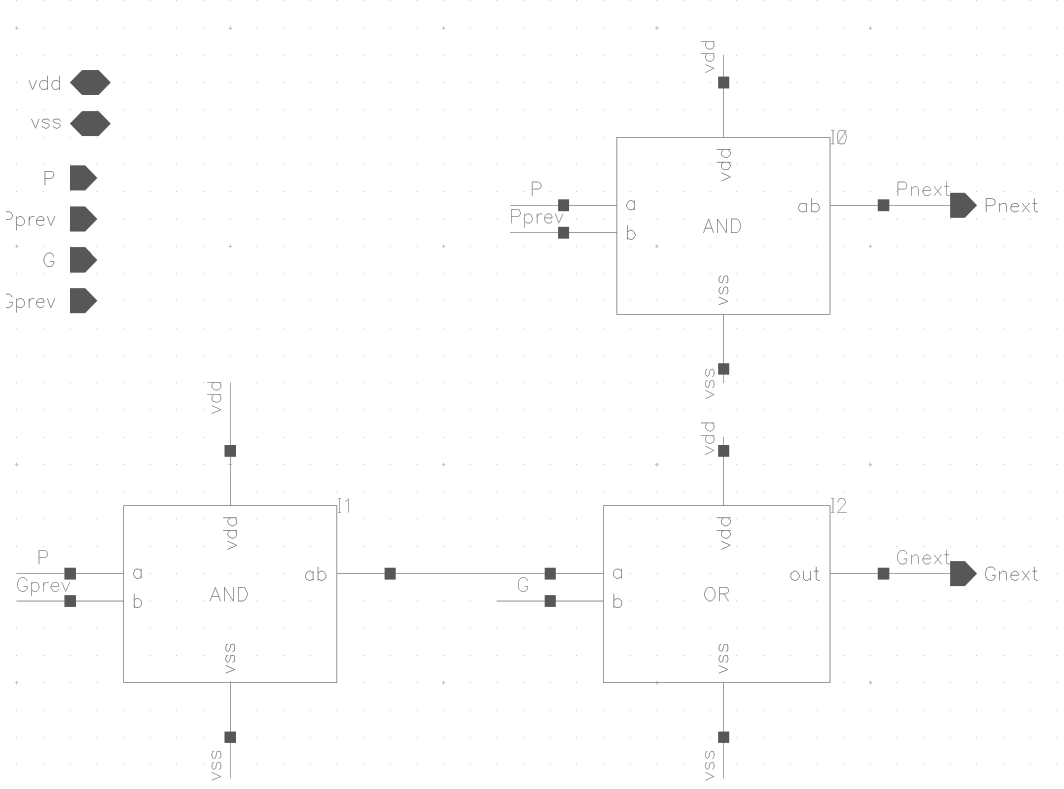

Figure 2 – Schematic view of the yellow block.

Table 3 – Logic table of yellow with carry block.

P_i	G_i	$G_{i,prev}$	$G = (P_i \wedge G_{i,prev}) \vee G_i$
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

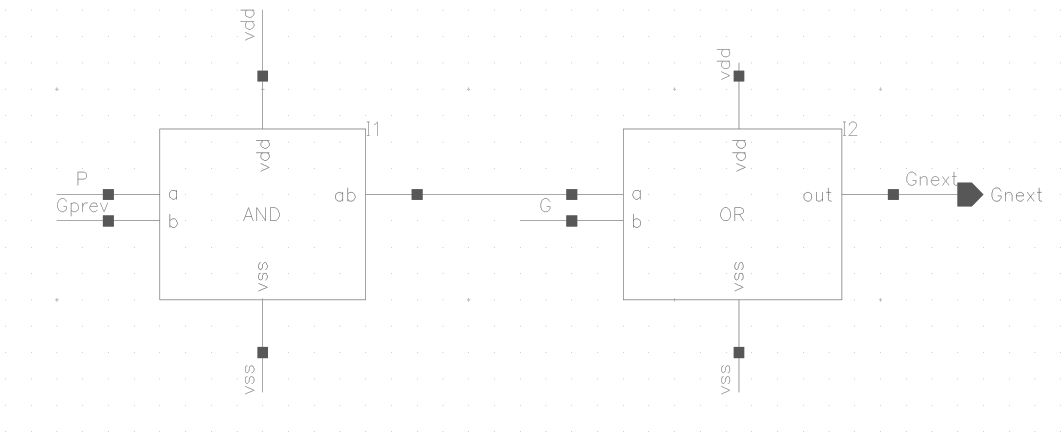

Figure 3 – Schematic view of the yellow carry block.

Table 4 – Logic table of sum block.

P_i	C_{i-1}	$S_i = P_i \oplus C_{i-1}$
0	0	0
0	1	1
1	0	1
1	1	0

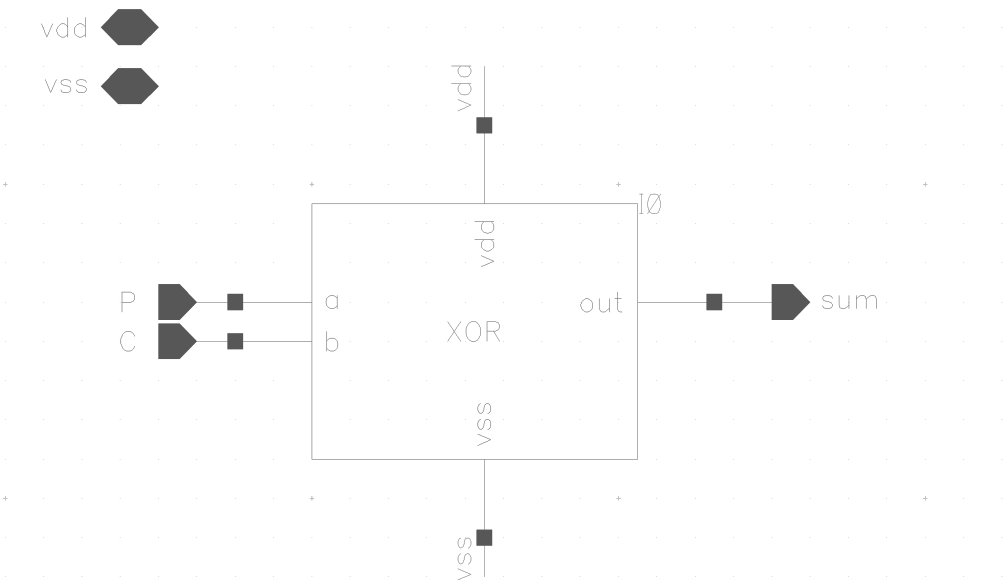

Figure 4 – Schematic view of the sum block.

2.3 Comparator

Table 5 – Logic table of XNOR block.

A_i	B_i	$Y = \overline{(A_i \oplus B_i)}$
0	0	1
0	1	0
1	0	0
1	1	1

3 Simulation Results

3.1 SPI In

3.1.1 Recieve

3.1.2 Hanken 2

3.1.3 Hanken 3

3.2 Kogge-Stone Adder

3.3 SPI Out

3.4 Comparator

3.5 Top Level

4 Risks and Delays

A Time Plan

B Time Report