TSEK06
High-Level Design Report

Group 5

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Version P1B

Status

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Approved	Martin Nielsen-Lönn	-

PROJECT IDENTITY

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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.
Lägg till bild på hur blocken sitter ihop och förklaring om P och G signalerna.

2.2.1 Red

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

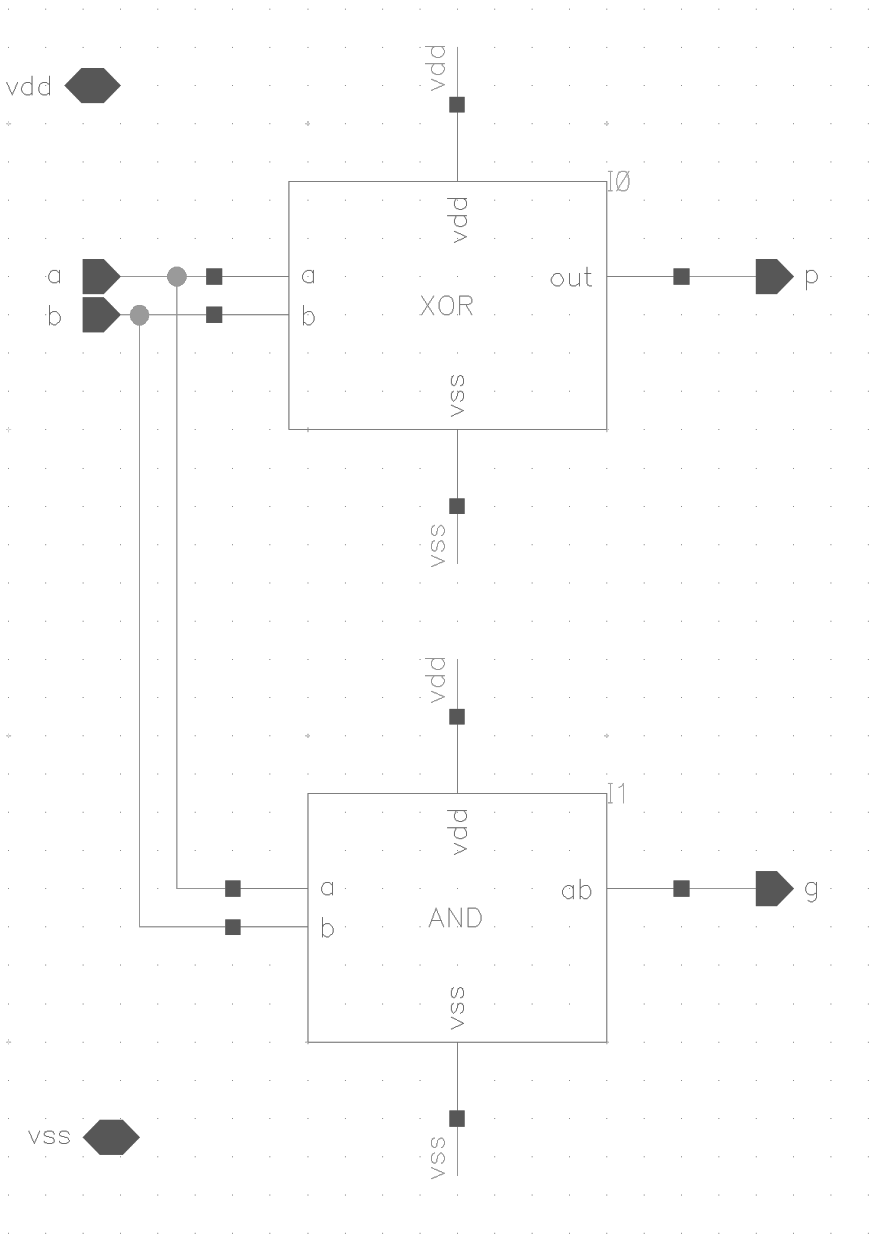

Figure 1 – Schematic view of the red block.

2.2.2 Yellow

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

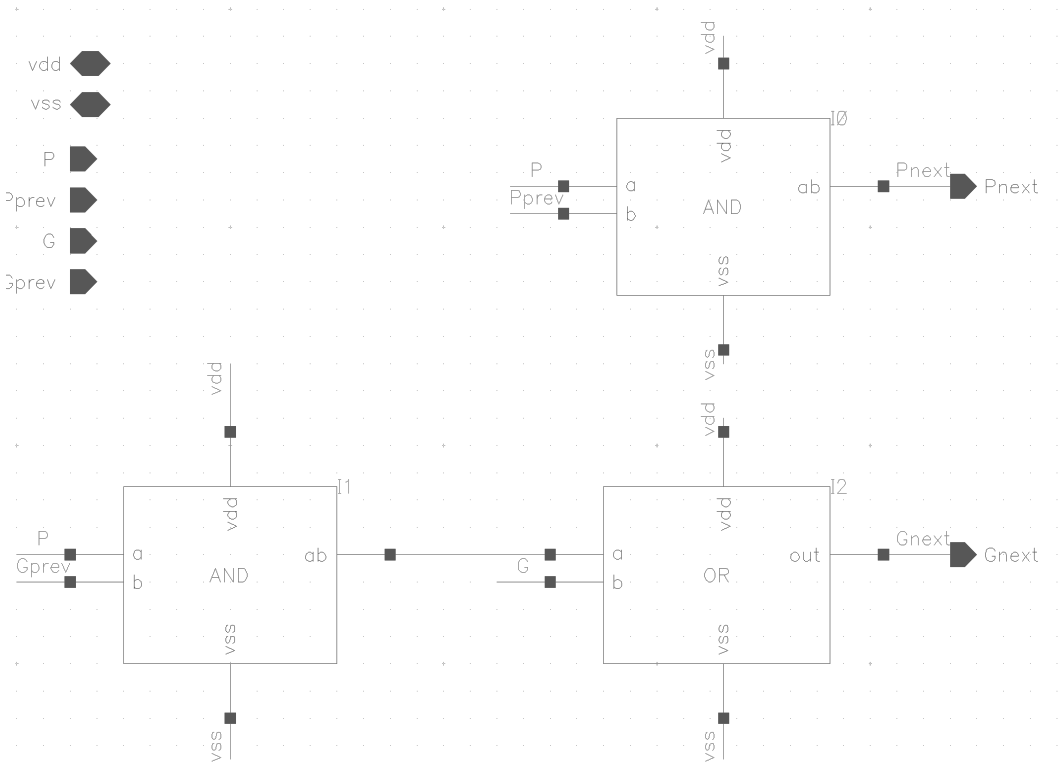

Figure 2 – Schematic view of the yellow block.

2.2.3 Yellow with carry

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

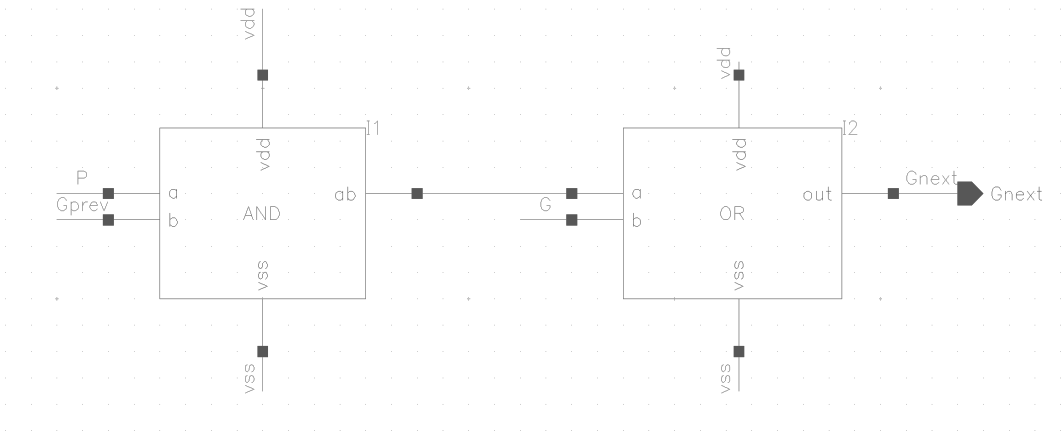

Figure 3 – Schematic view of the yellow carry block.

2.2.4 Sum

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

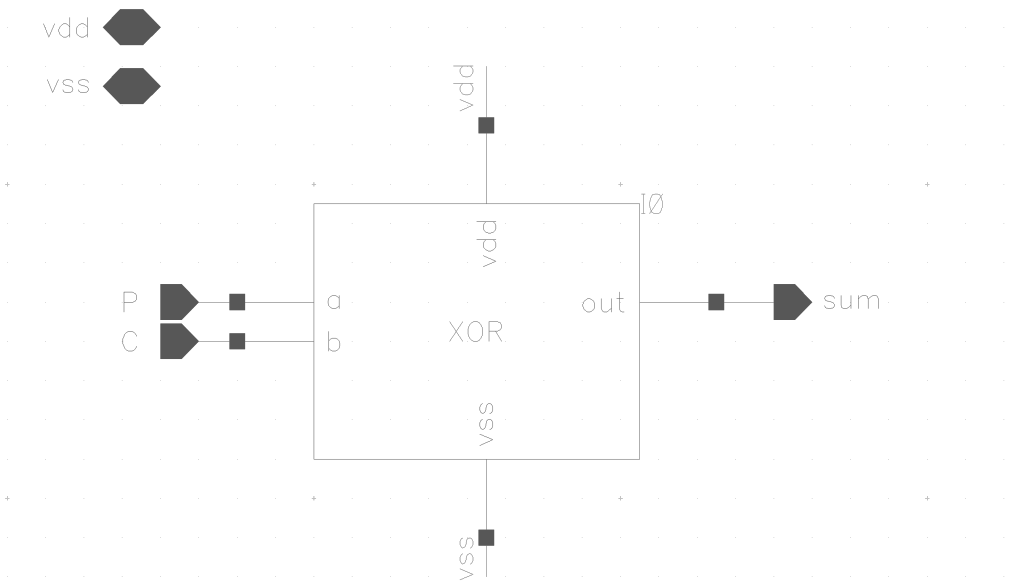

Figure 4 – Schematic view of the sum block.

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 Report