



Xilinx Inc.
 2100 Logic Drive
 San Jose, CA 95124
 Phone: +1 408-559-7778
 Fax: +1 408-559-7114
 E-mail: coregen@xilinx.com
 URL: www.xilinx.com

Features

- Drop-in modules for the XC4000E, EX, XL, XV and Spartan families
- Two data bus inputs: 2 to 32 bits wide
- Supports both 2's complement signed and unsigned data
- Registered output
- Load feature to directly load the output register
- Clock Enable for output register
- Asynchronous Clear for output register
- Uses Fast Carry logic for high speed
- High performance and density guaranteed through Relational Placed Macro (RPM) mapping and placement technology
- Available in Xilinx CORE Generator

Functional Description

The Registered Loadable Adder module accepts two input buses, **A** and **B**, and a carry input, (**CI**), adds them, and registers the sum, **S**. The input data buses can be 2's complement signed or unsigned numbers. The carry input (**CI**) is interpreted as a 1-bit binary value.

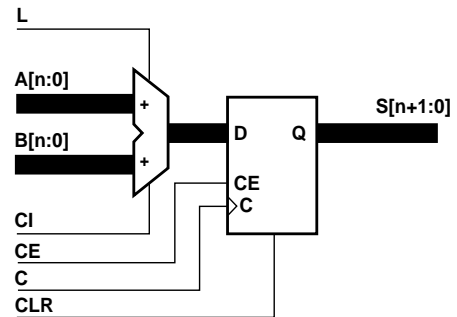
The output bus width is automatically set to the input bus width plus 1 to accommodate any carry that may be produced when adding the MSB's of the input operands.

When the Load (**L**) and Clock Enable (**CE**) signals are asserted, the **B** input data bus is loaded directly into the output register on the rising edge of the Clock.

Since the output bus is 1-bit wider than the **B** input bus, when data is loaded into the register (**L**=HIGH), the additional bit in the output bus - the MSB - is set to 0 if unsigned data is selected, or is assigned the same value as the MSB of the **B** input bus if signed data is selected.

Pinout

Signal names for the schematic symbol are shown in Figure 1 and described in Table 1.



X8488

Figure 1: Core Schematic Symbol

Table 1: Core Signal Pinout

Signal	Signal Direction	Description
L	Input	LOAD – active high signal bypasses the adder and directly loads the B data into the output register.
A[n:0]	Input	A DATA INPUT – value is added to B data and Carry Input (CI). Ignored when Load (L) is active.
B[n:0]	Input	B DATA INPUT – value is added to A data, and Carry Input (CI).
CI	Input	CARRY IN – carry input. Treated as a 1-bit unsigned binary number and added to A. Ignored when Load (L) is active.
CE	Input	CLOCK ENABLE – active high signal used to enable the transfer of data from the adder or the B input to the output register.
C	Input	CLOCK – with the exception of asynchronous control inputs (where applicable), control and data inputs are captured, and new output data formed on rising clock transitions.
S[n+1:0]	Output	SUM DATA OUTPUT – the registered output of the adder. Note: 1-bit wider than input operands, A and B.
CLR	Input	ASYNCHRONOUS CLEAR - resets the output register. Overrides Clock and Clock Enable. Level sensitive.

CORE Generator Parameters

The CORE Generator parameterization window for this macro is shown in Figure 2. The parameters are as follows:

- **Component Name:** Enter a name for the output files generated for this module.
- **Input Width:** Select an input bit width from the pull-down menu. The valid range is 2-32. The same data width is applied to both the A and B inputs. The output size is automatically set to the input width plus one.
- **Signed:** Select Signed or Unsigned.

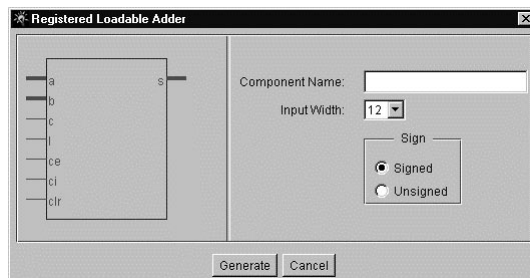


Figure 2: Parameterization Window

Core Resource Utilization

Table 2 shows the number of CLBs required for each available bit width.

Ordering Information

This macro comes free with the Xilinx CORE Generator. For additional information contact your local Xilinx sales representative, or e-mail requests to coregen@xilinx.com.

Table 2: Bit Width versus CLB Count

Bit Width	CLB Count
2	2
3	2
4	3
5	3
6	4
7	4
8	5
9	5
10	6
11	6
12	7
13	7
14	8
15	8
16	9
17	9
18	10
19	10
20	11
21	11
22	12
23	12
24	13
25	13
26	14
27	14
28	15
29	15
30	16
31	16
32	17

Parameter File Information

Parameter Name	Type	Notes
Component_Name	String	
Input_Width	Integer	2 - 32
Signed	Boolean	True/False