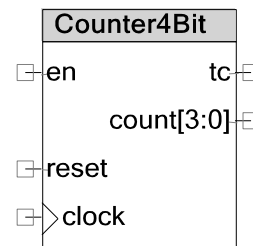


Count4Bit

1.10

Features

- 4-bit up counter with enable and reset
- Terminal count (tc) and 4-bit count output
- Implemented completely in hardware



General Description

The Count4Bit component is a hardware-only, 4-bit up counter implemented in the Programmable Logic Device (PLD) portion of the PSoC Universal Digital Blocks (UDBs).

When to Use the Count4Bit component

This component provides two distinct advantages over a standard fixed-function or UDB-based counter available in the Cypress Component Catalog:

- Resource-efficiency
- The 4-bit count value is available as an output

Thus this component serves applications like small state machines for which a 4-bit counter is sufficient.

Input/Output Connections

There are 3 inputs and 2 outputs for the Count4Bit component.

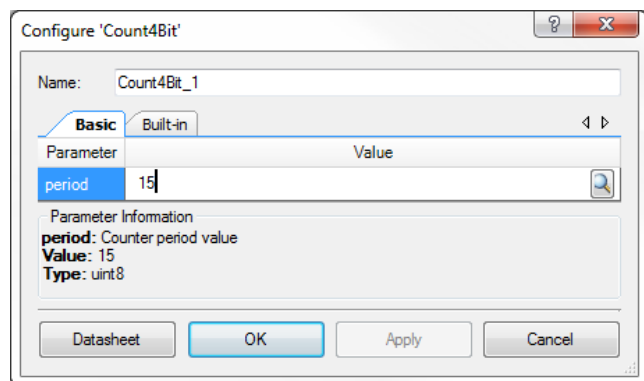
Input	May Be Hidden	Description
en	N	Hardware enable. This connection enables the counter to increment on each rising edge of the clock. If this input is low the outputs are still active but the component does not change states.
reset	N	Active high, synchronous reset. It requires at least one rising edge of the clock to reset the counter value to 0.
clock	N	The clock input defines the operating frequency of the component. The counter value is incremented on the rising edge of this input while the component is enabled.

Output	May Be Hidden	Description
tc	N	Synchronous terminal count. Goes high for one cycle when the count value equals the period value. The output is synchronous to the clock input of the component.
count	N	4-bit count value. Shows current counter state.

Component Parameters

Drag the Count4Bit component on to your design and double-click it to open the Configure dialog box. The Configure dialog box has two tabs. The Basic tab contains one parameter which defines the period value for the Count4Bit component.

Basic Options



period

The period value defines the terminal count of the counter. If enabled, the counter counts up from 0 to the period value on every rising edge of the clock. It can have values between 0 and 15, both included.

Placement

PSoC Creator automatically places it within the UDB array in the best possible configuration.

Resources

The Count4Bit component uses the following device resources:

Resources	Count
Datapath	0 of 24
Status cells	0 of 24
Control/count7 cells	0 of 24
Total Pterms	11 of 384
Macrocells	5 of 192
PLDs	2 of 48
Interrupts	0 of 32
Digital clock dividers	0 of 8
Sync blocks	0 of 92
Flash	0
RAM	0

Note The total available resources may vary across device part numbers.

As expected, the counter consumes 5 macrocells – one for each of the outputs. Note that a down-counter would consume fewer Pterms.

Application Programming Interface

None. The Count4Bit component is hardware-only.

DC and AC Electrical Characteristics

AC Specifications

Parameter	Description	Conditions	Min	Typ	Max	Units
	Operating frequency	-	-	-	67	MHz



Concept Component Changes

This section lists the major changes in the component from the previous version.

Version	Description of Changes
1.00	Initial design
1.10	Updated datasheet, changed 4'b0 to 4'b0000 in code.

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