

Triple Timer Counter (TTC) IP

Overview

Cadence® IP Factory delivers custom, synthesizable IP to support specific design requirements.

The **Cadence Triple Timer Counter IP** is compliant with the *AMBA® 2 Specification*.

The **Cadence Triple Timer Counter IP** contains three independently programmable 16-bit timer/counters with 16-bit prescalers. The input to each prescaler/counter pair can be taken from the ARM® AMBA® 2 Advanced Peripheral Bus (APB) interface clock (pclk), or an external clock input (ext_clk[3:1])

The **Cadence Triple Timer Counter IP** is architected to quickly and easily integrate into any system on chip (SoC), and to connect seamlessly to Cadence, or third-party, APB-based bus master devices.

The **Cadence Triple Timer Counter IP** provides a convenient, cost-effective timing solution for your design. It offers SoC integrators the advanced capabilities and support that not only meet, but exceed the requirements of high-performance designs and implementations.

Cadence SoC Peripheral IP is silicon proven and has been extensively validated with multiple hardware platforms.

Cadence IP Factory offers comprehensive IP solutions that are in volume production, and have been successfully implemented in more than 400 applications.

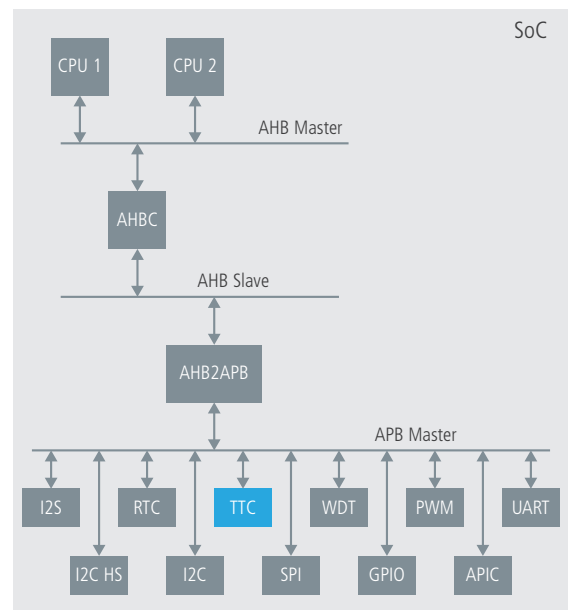


Figure 1: Example System-level Block Diagram

Key Features

- Three independent 16-bit timers/counters
- Internal (pclk) or external clock source
- Interrupt generated on six different events for each timer/counter
- 16-bit event timer on each timer/counter for measuring output pulse width
- Each timer/counter supports count up and count down operation
- Count register for each timer/counter can be read at any time through the APB interface
- APB slave interface to SoC

Product Details

The **Cadence Triple Timer Counter IP** is a low gate count, flexible peripheral for providing advanced timing and counting features to any SoC design.

Timers/Counters

The **Cadence Triple Timer Counter IP** contains three independent 16-bit timer/counters. Each timer/counter can be clocked from the APB interface (pclk), or a separate external clock input (ext_clk[3:1]). External clock inputs are synchronized to pclk before being applied to the corresponding timer/counter.

Each timer/counter can be configured for count up or count down operation.

Prescaler

Each timer/counter includes a programmable, 16-bit prescaler to decrease the frequency of the clock sent to the timer/counter. Since the prescaler is a simple divider, the input frequency of the timer/counter can be divided by 2 to 65,536.

Event Timer

Each timer/counter has a programmable, 16-bit event timer to measure the pulse width of the corresponding ext_clk input, allowing the **Cadence Triple Timer Counter IP** to work with noisy signals.

Interrupts

The **Cadence Triple Timer Counter IP** has three separate interrupt outputs, one for each timer/counter. Individual interrupts can be configured through the APB interface.

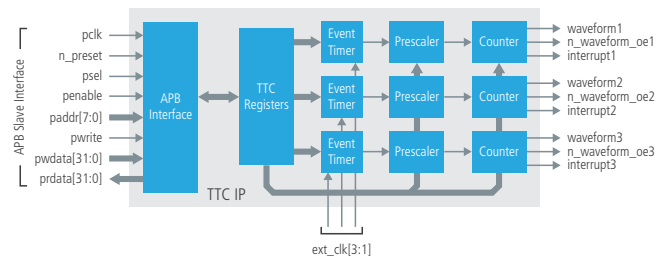


Figure 2: IP-level Block Diagram

Each timer/counter supports six different sources for each interrupt. An interrupt may be generated on counter overflow, a programmable periodic interval, a timer value that equals any one of three match register values for the timer/counter, or when the event timer interval for the timer/counter expires.

Signal Interface

The **Cadence Triple Timer Counter IP** supports an APB slave interface for connection to APB bus masters such as a CPU core, or AHB2APB bridge. The APB slave interface includes PSEL and PENABLE, allowing a single SoC to contain multiple **Cadence Triple Timer Counter IP**.

Cadence IP Factory

Cadence IP Factory can deliver various configurations of SoC Peripheral IP to meet your design requirements.

For more information, visit ip.cadence.com

Benefits

- Low-risk solution—silicon-proven design
- Ease-of-use—customizable with easy integration
- Easy integration—supports industry-standard APB interface

Related Products

- Watchdog Timer (WDT) IP

Deliverables

- Clean, readable, synthesizable Verilog HDL
- Cadence Encounter® RTL Compiler synthesis scripts
- Documentation – integration and user guide, release notes
- Sample verification testbench

Available Products

- Triple Timer Counter (TTC) IP

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