

# TI C2000 Toolbox ePWM

This document describes *ePWM* component from TI C2000 Toolbox library.

## Short description

Pulse-Width Modulator is the most important peripheral in many of the power electronic systems. ePWM component enables user to configure the peripheral in order to generate desired gate driving signals. It supports several functionalities, such as:

- Variable carrier frequency,
- Variable carrier phase,
- Synchronizing multiple ePWM modules,
- ADC start-of-conversion triggering mechanism.

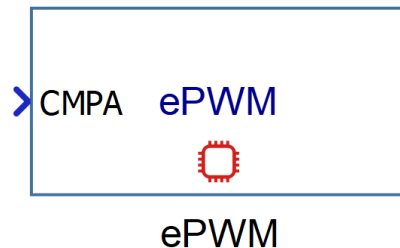


Figure 1. ePWM component icon.

## Detailed overview

**NOTE:** It is recommended to select *target platform* on [TI C2000 Setup](#) component before configuring the component.

Properties are grouped in tabs named after ePWM submodules.

### Component properties:

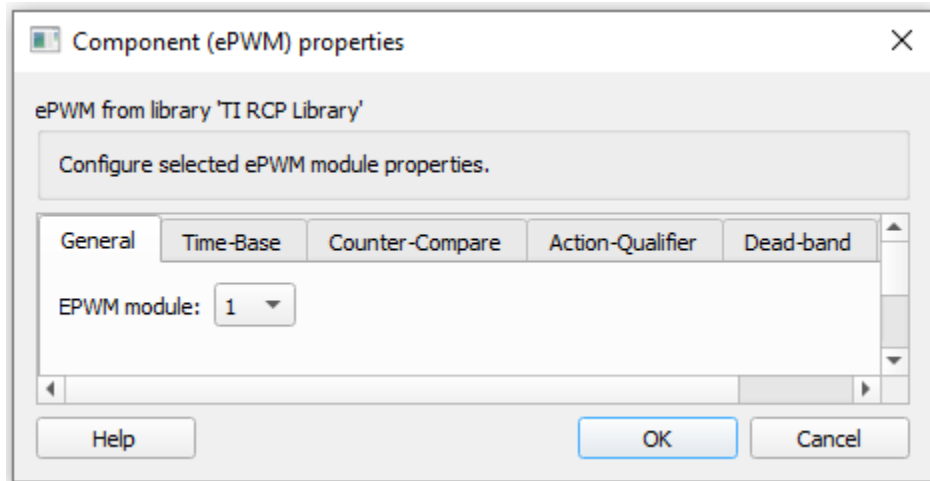
- Tab **General:**  
ePWM module – select module of the ePWM peripheral;
- Tab **Time-Base:**  
Essential bitfields/registers configuration for generating desired carrier signals and reference values (more details can be found in [TI Technical Reference Manual](#)).
  - CMPA source, TBPRD source, TBPHS source, PHDSIR source properties – ‘external’ in case of variable frequency/phase, ‘property’ if fixed. New inputs are created if ‘external’ is selected.
- Tab **Counter-Compare:**  
Registers for defining whether the duty cycle value is loaded from shadow registers or directly.

- **Tab Action-Qualifier:**  
Define type of action when ePWM counter value meets period or zero values, compare (duty cycle A and B) value when counting up and down – no action/set/clear/toggle digital output. Values can be provided from property (statically just in initialization code) or external input (dynamically in step code at component execution rate), depending on application.
- **Tab Dead-Band:**  
Configuring dead time generation:
  - Bitfields that define channel A and B signal routing through dead-band submodule,
  - RED: raising edge delay in clocks,
  - FED: falling edge delay in clocks.
- **Tab Event-trigger:**
  - ADC Start of Conversion A enabled – determines whether SOC trigger A is enabled,
  - ADC Start of Conversion B enabled – determines whether SOC trigger B is enabled,
  - ePWM Interrupt enabled - determines whether ePWM interrupt is enabled.

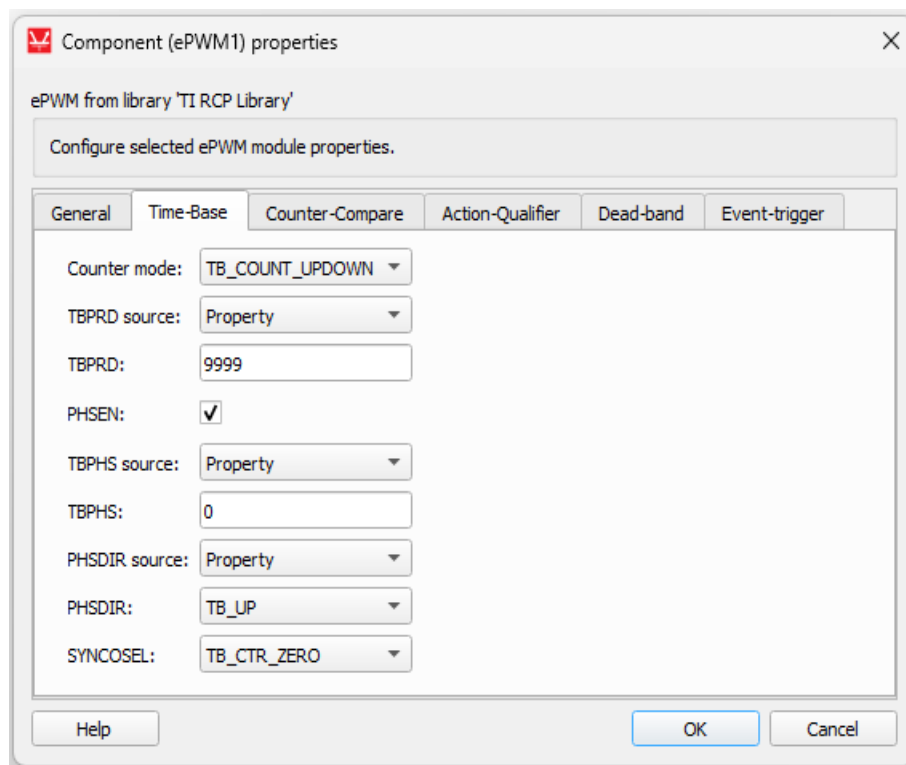
Fixed events for SOCA, SOCB and interrupt mechanisms is when counter equals zero. For more flexibility, target-oriented component is more suitable.

#### **Component inputs:**

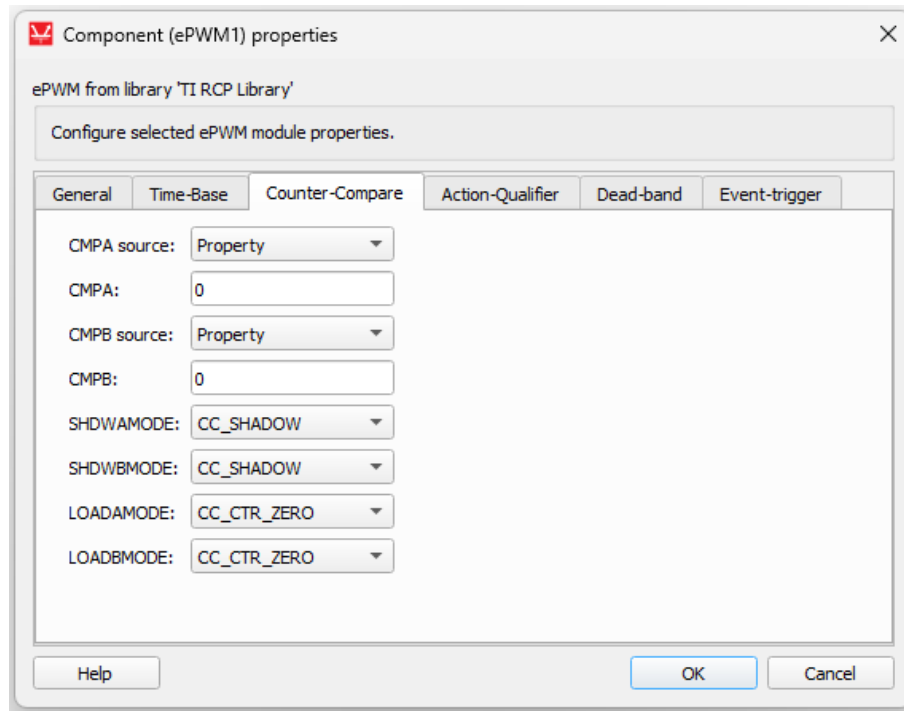
- CMPA – duty cycle relative to TBPRD value, visible if *CMPA source* is 'external',
- CMPB – duty cycle relative to TBPRD value, visible if *CMPB source* is 'external',
- TBPHS – phase offset register, visible when *TBPHS source* is 'external',
- TBPRD – time-base period, visible when *TBPRD source* is 'external',
- PHSDIR – phase direction bit, visible when *PHSDIR source* is 'external',
- CAU/CAD/CBU/CBD/ZRO/PRD – action to perform on pwm outputs when corresponding action-qualifier event happens, visible when source is 'external'.



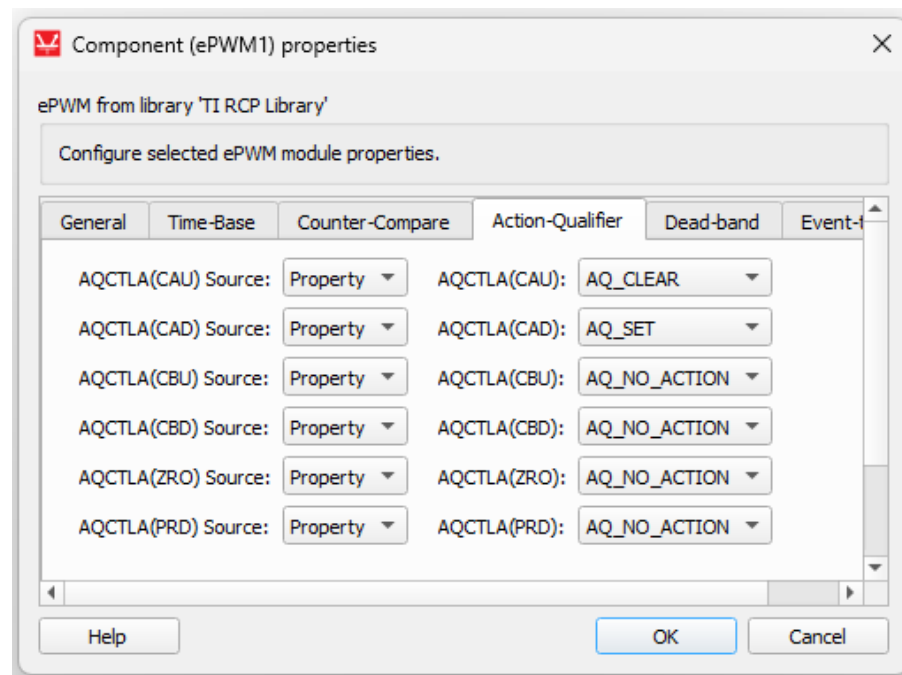
**Figure 2. ePWM component dialog - General tab.**



**Figure 3. ePWM component dialog - Time-Base tab.**



**Figure 4. ePWM component dialog - Counter-Compare tab.**



**Figure 5. ePWM component dialog - Action-Qualifier tab.**

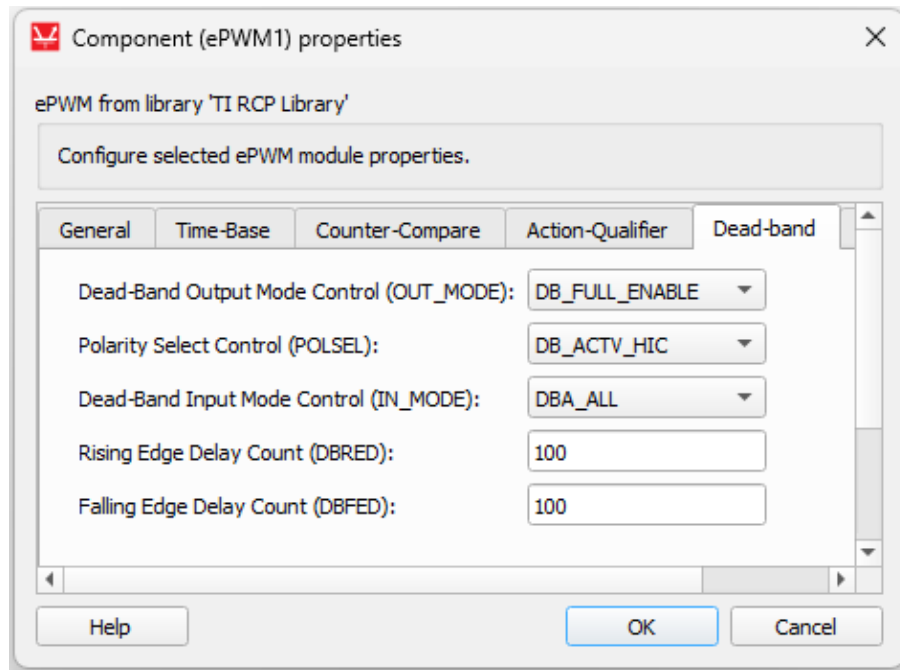


Figure 6. ePWM component dialog - Dead-band tab.

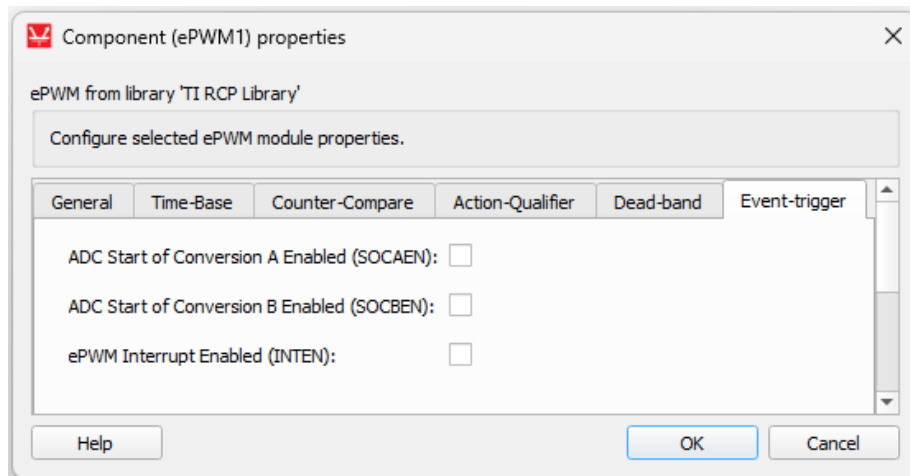


Figure 7. ePWM component dialog - Event-trigger tab.