

TI C2000 Toolbox ePWM (Generic)

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

Short description

Pulse-Width Modulator is the most important peripheral in many of the power electronic systems. *ePWM* (Generic) component enables user to configure the peripheral in order to generate desired gate driving signals in a simplified way without direct interaction with bitfields and registers. It supports several functionalities, such as:

- Variable carrier frequency;
- Variable carrier phase;
- Synchronizing multiple *ePWM* modules,
- ADC start-of-conversion trigger,
- Interrupt.

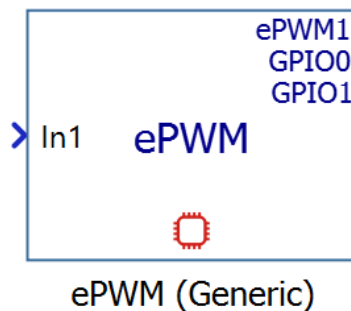


Figure 1. *ePWM* - component icon.

Detailed overview

Properties are grouped in tabs named after *ePWM* submodules.

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

Component properties:

- Tab **HIL**:
 - Channel A - HIL DI number – select digital input(s) of the HIL device where PWM signal(s) of channel(s) A will be applied. Combo values depend on *Number of channels* in *PWM* tab.
 - Channel B – HIL DI number – digital input(s) of the HIL device where PWM signal(s) of channel(s) B will be applied. This property is always disabled since its purpose is only to show where the channel B PWM(s) will be applied, it is determined by the selection of previous property value.

- Interface type - select interface board that is used, currently supported boards are '*HIL TI Launchpad Interface*' and '*HIL TI uGrid Launchpad Interface*', '*HIL DSP 180 Interface*' and '*HIL DSP Interface*'.
- Controller index - visible when '*HIL TI uGrid Launchpad Interface*' is selected, specifies which MCU slot on the interface board is used.
- Execution rate – Desired rate at which component inputs will be applied. This value must be compatible with other components of the same subsystem: the value must be a multiple of the fastest execution rate in the circuit. To specify the execution rate, you can use either decimal (e.g. 0.001) or exponential values (e.g. 1e-3) in seconds. Alternatively, you can type in 'inherit' in which case the component will be assigned execution rate based on the execution rate of the components it is receiving input from.

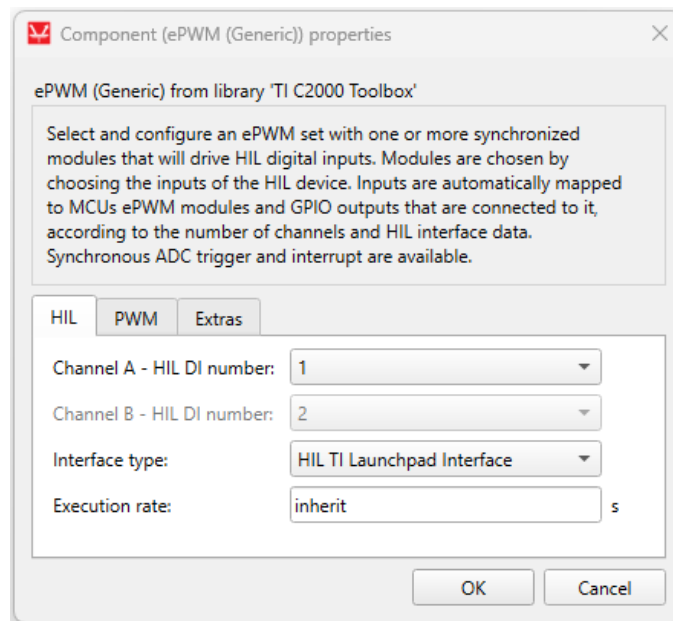


Figure 2. ePWM (Generic) component dialog - HIL tab.

Selected HIL DI number(s) is mapped to corresponding MCU digital pin according to the selected [interface board](#). Currently supported interface boards are [HIL TI Launchpad Interface](#) and [HIL TI uGrid Launchpad Interface](#), [HIL DSP 180 Interface](#) and [HIL DSP Interface](#).

- **Tab PWM:**

- Number of channels – select number of ePWM modules to be used,
- Operation mode – fixed or variable carrier signal frequency,
- Phase operation mode – fixed or variable carrier signal phase offset, visible only when *Number of channels* is more than one.

- Frequency – carrier signal frequency value in Hz, visible if *Operation mode* is set to 'fixed carrier frequency',
- Carrier phase offset – carrier signal phase offset value relative to previous ePWM module in degrees, visible if *Phase operation mode* is set to 'Fixed carrier phase offset',
- Dead time – dead time value in seconds,
- Reference signal [min, max] – minimum and maximum values of the carrier signal of ePWM module(s) used by the generic component. It should be defined as a list of two elements in ascending order.
- Load mode – timing of duty cycle value loading from shadow register to counter-compare register – on carrier signal minimum, maximum or either values.

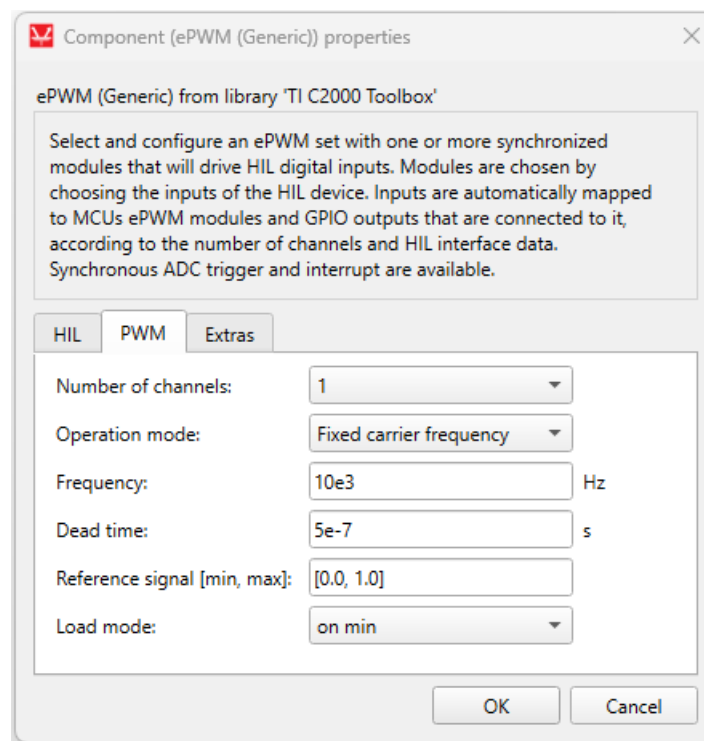


Figure 3. ePWM (Generic) component dialog - PWM tab.

- **Tab Extras:**

- ADC trigger enabled – enabled synchronous ADC sampling trigger,
- ADC trigger timing – specifies moment regarding the carrier signal value when trigger pulse will be generated. Visible if *ADC trigger enabled* is enabled.
- Trigger ADC on – number of events specified in *ADC trigger timing* required to occur before generating the trigger pulse. Visible if *ADC trigger enabled* is enabled.

- Interrupt trigger enabled – enables ePWM interrupt generation. In case when multiple ePWM modules are used with one generic component, the first module of the chain will generate the interrupt pulse.
- Interrupt trigger timing – specifies moment regarding the carrier signal value when interrupt pulse will be generated. Visible if *Interrupt enabled* is enabled.
- Trigger Interrupt on – number of events specified in *Interrupt trigger timing* required to occur before generating the interrupt pulse. Visible if *Interrupt enabled* is enabled.

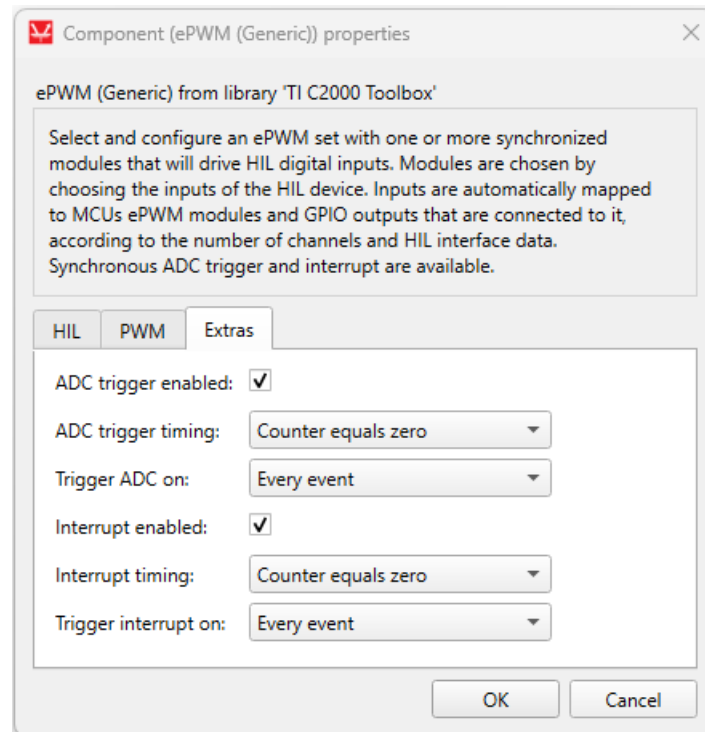


Figure 4. ePWM (Generic) component dialog - Extras tab.

Component inputs:

- In1, In2... – duty cycle [0, 1] – one input per *Number of channels* for each channel,
- freq – carrier frequency In Hz, visible only when *Operation mode* is set to 'Variable carrier frequency',
- offset2, 3... – carrier phase offset in degrees relative to previous module in case of multiple synchronized ePWM modules, visible only when *Phase operation mode* is set to 'Variable carrier phase offset'.

For **all** inputs:

- Supported types: real, uint, int
- Vector support: no