

TPI SB-PWM - Helper block

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Engineer

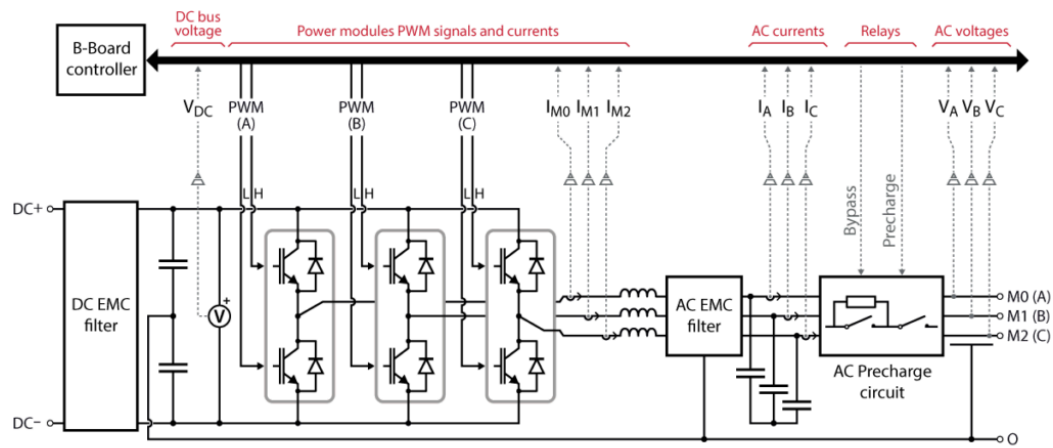
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The TPI SB-PWM helper block is a wrapper that simplifies the use of the [SB-PWM block](#) with the [all-in-one programmable inverter](#) (TPI8032 22kW). The TPI SB-PWM helper block allows the configuration of the TPI PWM outputs to be used with a custom modulator implemented in FPGA. Since the topology of the converter is fixed, the channel assignment and part of the modulators' configuration are known beforehand.

The topology of the converter and the connection of the PWM channels are shown below. To prevent short-circuiting the DC bus, the upper and lower leg switches always use pseudo-complementary signals with a fixed dead-time of 124 ns. This value was chosen as low as possible to minimize the distortion introduced by the dead-time.



Topology of the TPI8032

PWM channel	PWM lane	Description
A	0	PWM High – Phase A (M0)
	1	PWM Low – Phase A (M0)
B	2	PWM High – Phase B (M1)
	3	PWM Low – Phase B (M1)
C	4	PWM High – Phase C (M2)
	5	PWM Low – Phase C (M2)

PWM channels and lanes assignment

The TPI SV-PWM helper block is available starting from [version 2024.2](#) of the SDK. The TPI8032 is **required** to use this driver.

Simulink SB PWM helper block

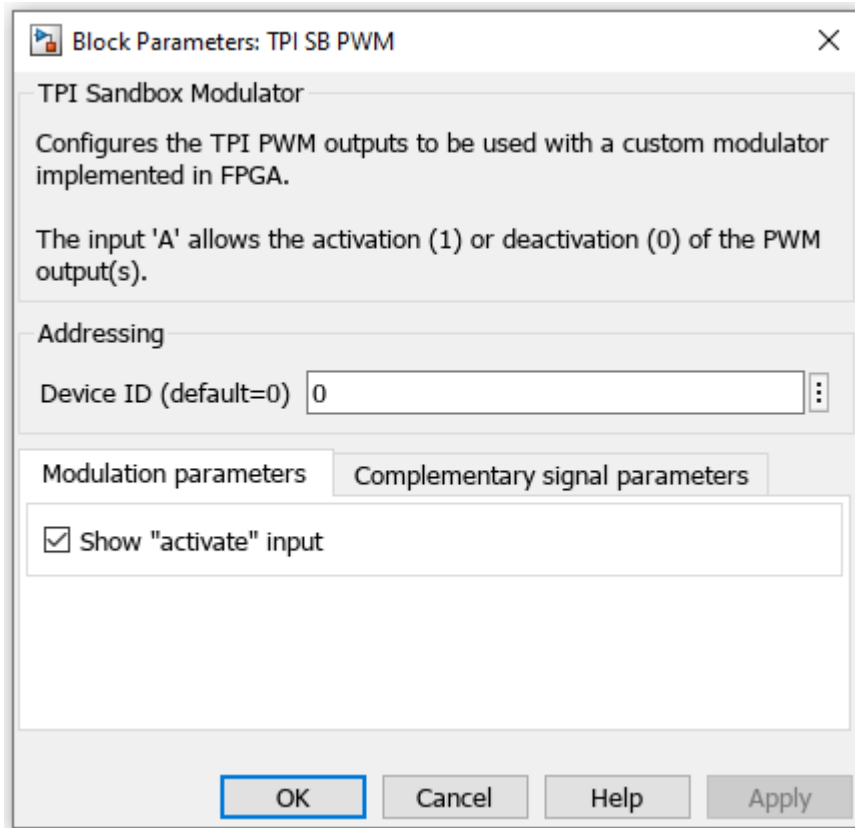
Signal specification

The input A allows the activation (>0) or deactivation (≤ 0) of the PWM output(s).



Parameters

- Device ID: selects which device to address when used in a multi-device configuration.
- Show "activate" input: makes the A signal input visible. If not checked, the TPI SB-PWM block is active by default.



Block Parameters: TPI SB PWM

TPI Sandbox Modulator
Configures the TPI PWM outputs to be used with a custom modulator implemented in FPGA.

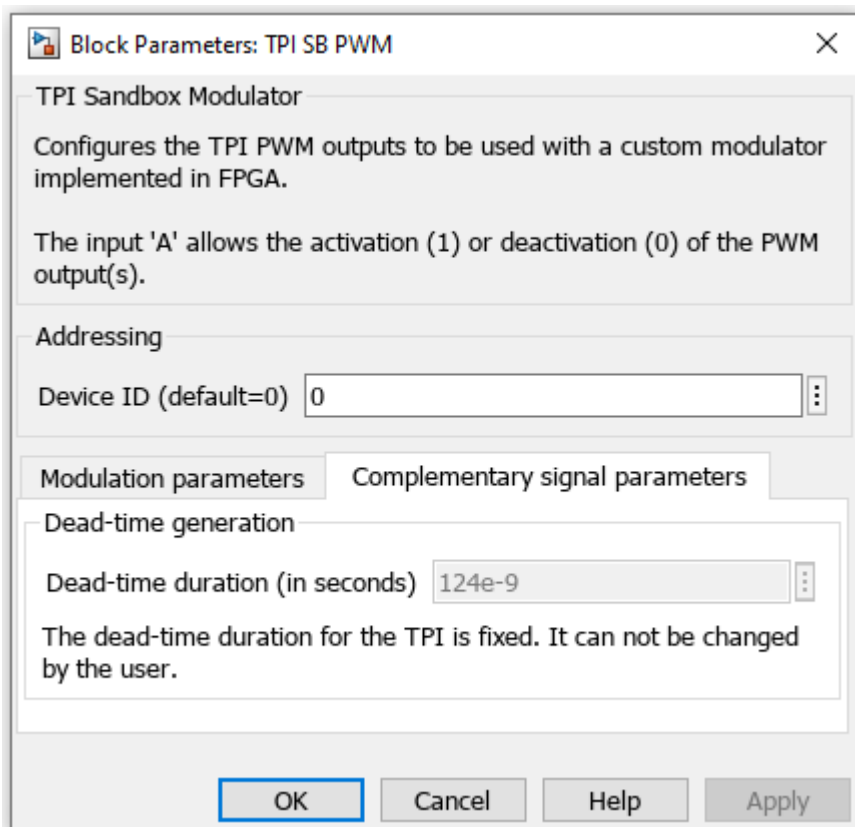
The input 'A' allows the activation (1) or deactivation (0) of the PWM output(s).

Addressing
Device ID (default=0)

Modulation parameters **Complementary signal parameters**

☒ Show "activate" input

Buttons: OK, Cancel, Help, Apply



Block Parameters: TPI SB PWM

TPI Sandbox Modulator
Configures the TPI PWM outputs to be used with a custom modulator implemented in FPGA.

The input 'A' allows the activation (1) or deactivation (0) of the PWM output(s).

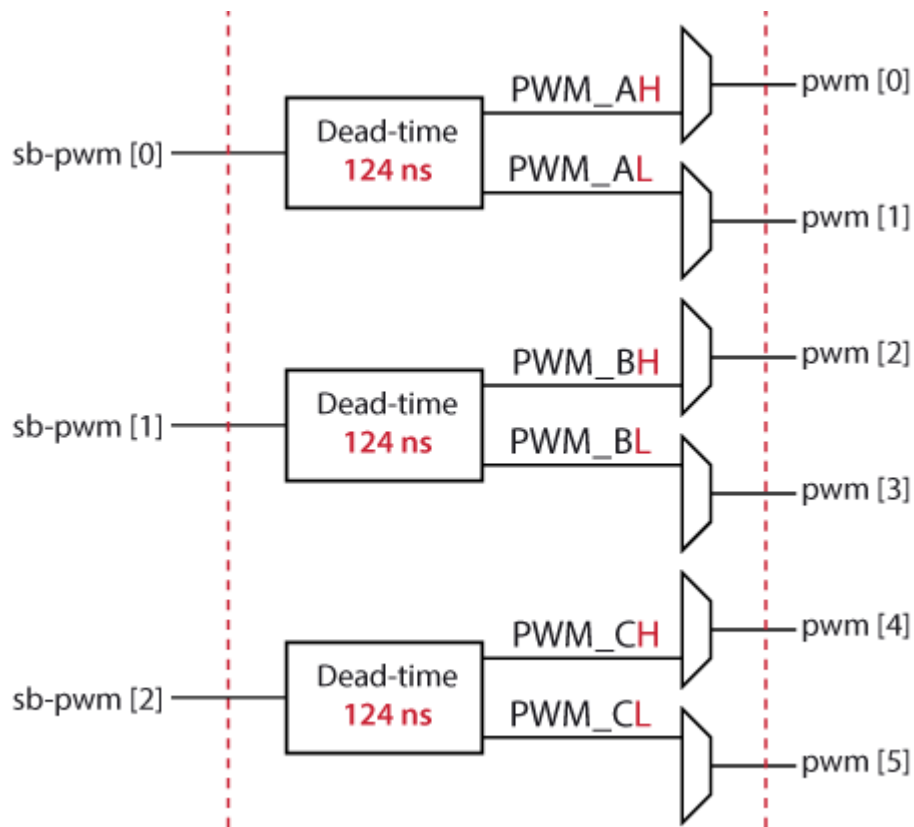
Addressing
Device ID (default=0)

Modulation parameters **Complementary signal parameters**

Dead-time generation
Dead-time duration (in seconds)

The dead-time duration for the TPI is fixed. It can not be changed by the user.

Buttons: OK, Cancel, Help, Apply

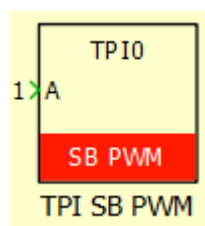


Mapping between sb_pwm and PWM ports of the imperix IP in Vivado

PLECS SB PWM helper block

Signal specification

The input A allows the activation (>0) or deactivation (≤ 0) of the PWM output(s).



Parameters

- Device ID selects which device to address when used in a multi-device configuration.
- PWM activation makes the A signal input visible if the option *Use block input* is selected. If not, the CB-PWM block is activated by default.

Block Parameters: untitled/TPI SB PWM ✕

TPI SB-PWM - Sandbox PWM (mask) (link)

Configures the TPI PWM output(s) to be used with a custom modulator implemented in FPGA.

The input signal 'A' allows the activation (1) or deactivation (0) of the PWM output(s).

Addressing Modulation parameters Complementary signal parameters

Device ID (default=0):

☐

Block Parameters: untitled/TPI SB PWM ✕

TPI SB-PWM - Sandbox PWM (mask) (link)

Configures the TPI PWM output(s) to be used with a custom modulator implemented in FPGA.

The input signal 'A' allows the activation (1) or deactivation (0) of the PWM output(s).

ng Modulation parameters Complementary signal parameters

PWM activation:

☐

Block Parameters: untitled/TPI SB PWM ✕

TPI SB-PWM - Sandbox PWM (mask) (link)

Configures the TPI PWM output(s) to be used with a custom modulator implemented in FPGA.

The input signal 'A' allows the activation (1) or deactivation (0) of the PWM output(s).

ng Modulation parameters Complementary signal parameters

Dead-time duration (in seconds):

☐

C++ functions

There are no C++ helper functions for the TPI. Please refer to the [generic SB-PWM functions](#).