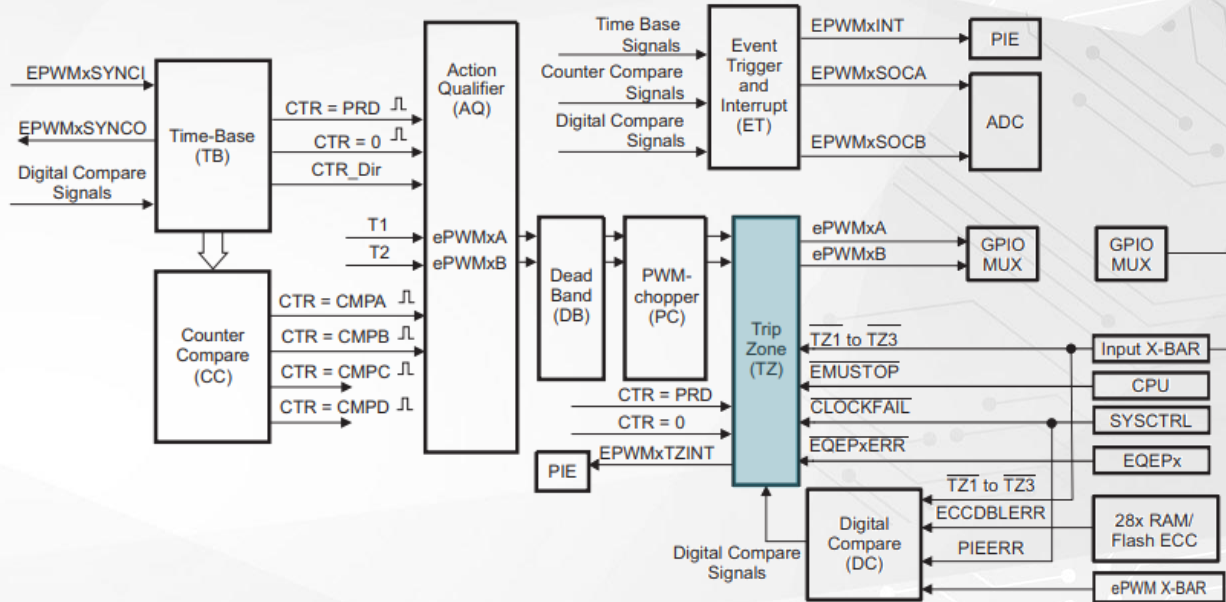


# ePWM Trip-Zone Submodule

**C2000 Enhanced Pulse Width Modulator (ePWM) Series**

# Trip-Zone (TZ) Submodule

- Upon a fault condition (TZ1-TZ6), outputs EPWMxA and EPWMxB can be configured to take on specific actions
- Supports different trip types: One-Shot Trip (OSHT) and Cycle-by-Cycle (CBC)



# Trip-Zone Submodule: Trip Types

## Cycle-by-Cycle Trip

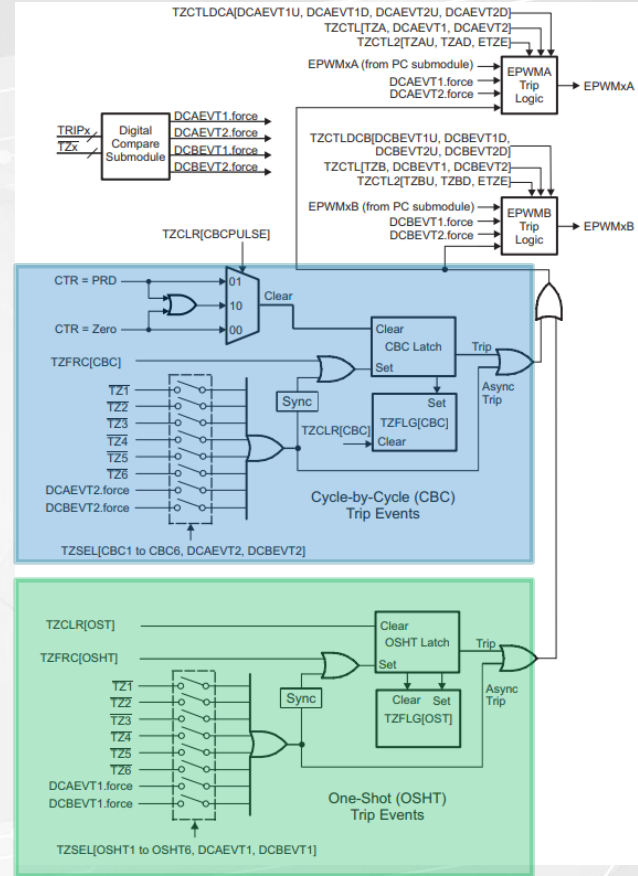
A cycle-by-cycle trip is used for current limiting operations.

When a cycle-by-cycle trip is detected, the trip-zone submodule drives EPWMxA and EPWMxB to a certain specified state. The outputs will go back to their pre-trip state at the next ZRO, PRD, or ZRO/PRD events.

## One-Shot Trip

A one-shot trip is used for major short-circuits or over-current conditions.

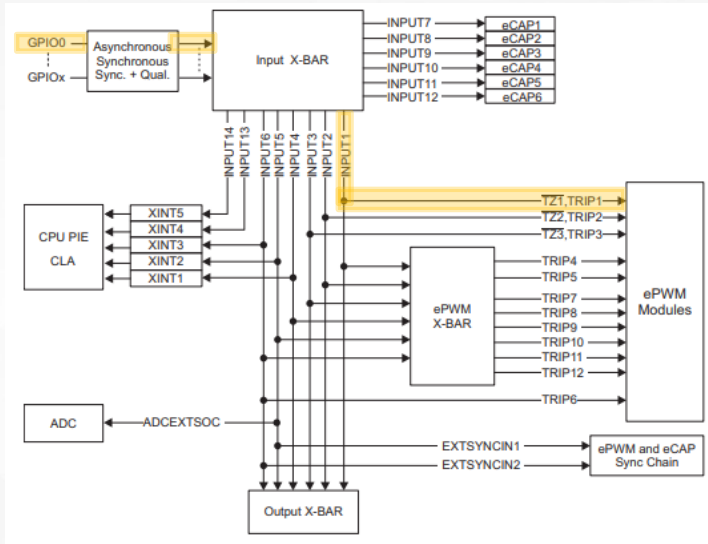
When a one-shot trip is detected, the trip-zone submodule drives EPWMxA and EPWMxB to a certain specified state. The outputs will remain in that state until the trip is manually cleared.



# Trip-Zone Submodule: CBC Trip Example

**Example:** How do I configure a GPIO to cause a CBC Trip and drive my ePWM outputs low?

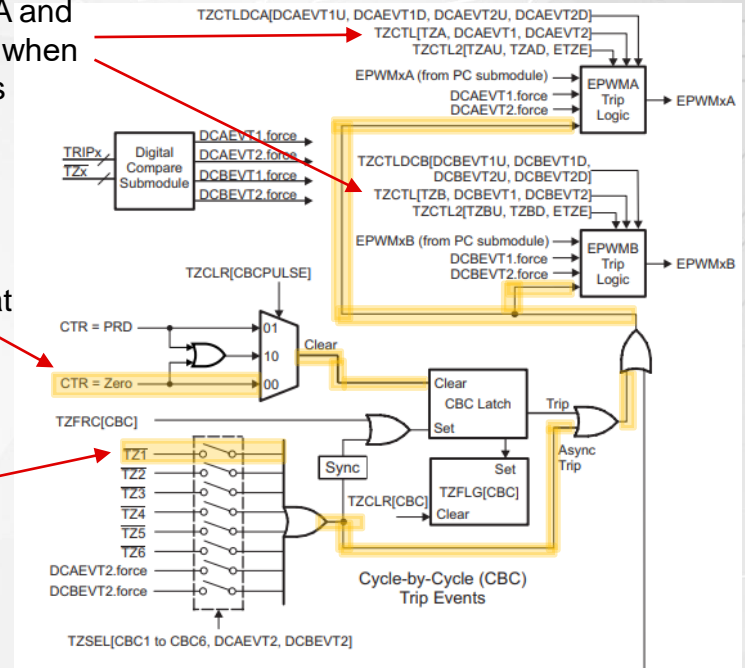
Using the Input X-Bar, any GPIO can be routed to the ePWM module as a Trip signal. In this example, we will choose GPIO 25.



Configure TZA and TZB to 'clear' when the trip occurs

Clear the trip at a ZRO event

Choose Trip 1 as the CBC Source



One-Shot Circuitry

# Trip-Zone Submodule: CBC Trip Example - Programming

From the previous example, we saw how to configure the Input X-Bar and Trip-Zone submodule for a CBC trip. How do we program this?

GPIO (1 of 169 Added) ⊕ ADD 🗑️ REMOVE ALL

✓ myGPIO25 🗑️

Name	myGPIO25
Analog Mode	Pin is in digital mode
GPIO Direction	Pin is a GPIO input
Pin Type	Push-pull output/floating input
Qualification Mode	Qualified with 3 samples
Master Core	CPU1 selected as master core
Write Initial Value	<input type="checkbox"/>

PinMux Peripheral and Pin Configuration ⌵

GPIO	GPIO25/K2 <span>🔒</span>
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INPUTXBAR (1 of 1 Added) ⊕ ADD 🗑️ REMOVE ALL

✓ myINPUTXBAR1 🗑️

Name	myINPUTXBAR1
INPUTs to be used	INPUTXBAR1
INPUTXBAR1	GPIO25
INPUTXBAR1 Lock	<input type="checkbox"/>

EPWM Trip Zone ⌵

Use Advanced EPWM Trip Zone Actions

TZA Event	Low voltage state
TZB Event	Low voltage state
DCAEVT1 Event	High impedance output
DCAEVT2 Event	High impedance output
DCBEVT1 Event	High impedance output
DCBEVT2 Event	High impedance output
One-Shot Source	None
CBC Source	TZ1 Cycle By Cycle
CBC Latch Clear Signal	Clear CBC pulse when counter equals zero
TZ Interrupt Source (ORed)	Trip Zones Cycle By Cycle interrupt
Register Interrupt Handler	<input type="checkbox"/>

# Additional ePWM Resources

- [C2000 Academy](#) with Hands-on Labs
- [TI Precision Labs: PWM Basics Overview](#)
- [TI Precision Labs: Motor Interfaces and PWM Frequencies](#)
  
- ePWM Application Reports
  - [Flexible PWMs Enable Multi-Axis Drives, Multi-Level Inverters](#)
  - [Using PWM Output as a Digital-to-Analog Converter](#)
  - [Using the ePWM Module for 0% - 100% Duty Cycle Control](#)
  - [Leverage New Type ePWM Features for Multiple Phase Control](#)

Check Video Description for Additional Resources