

# F28P55x编程实例系统集成

- **Code Composer Studio**
- **C2000Ware**
- **LaunchXL-F28P55x**

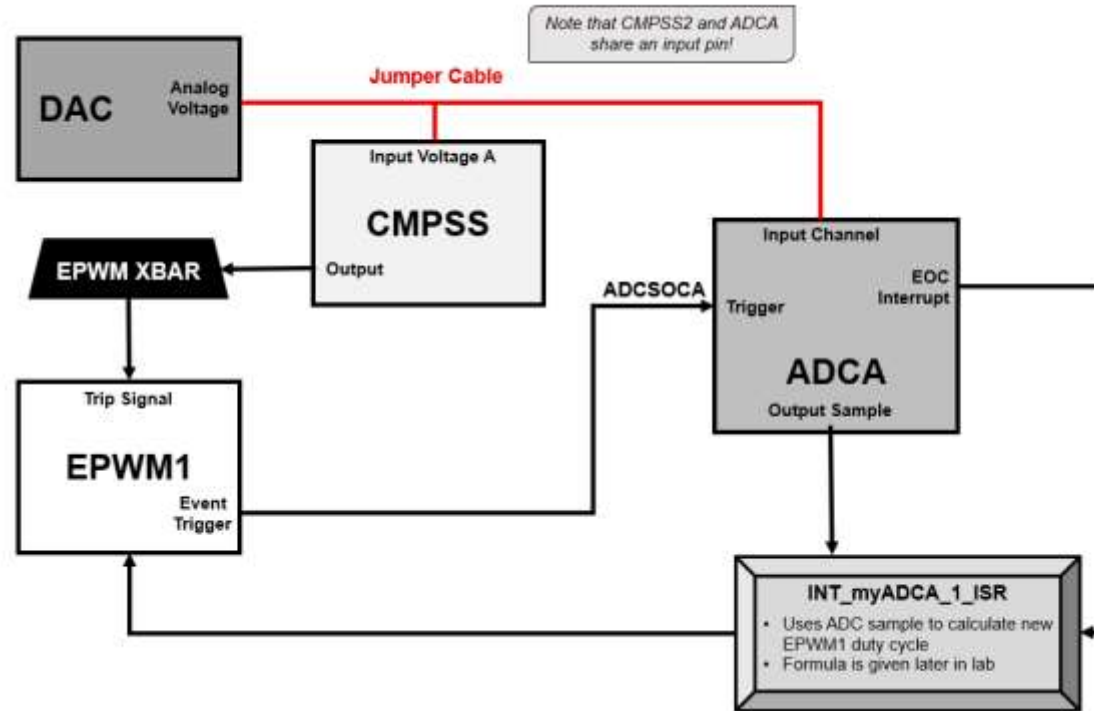
# 系统集成

## 功能实现

EPWM产生方波触发ADC的转换开始，DAC产生模拟信号用于ADC采样，EPWM的占空比根据ADC采样结果而发声变化，同时，DAC的采样结果通过比较器和阈值比较，当DAC结果超过阈值后，PWM输出低电平。

## 实现步骤

- 复制空白工程
- Sysconfig配置GPIO
- Sysconfig配置ADC
- Sysconfig配置DAC
- Sysconfig配置CMPSS
- Sysconfig配置EPWM
  
- 编写应用代码



片上资源	PIN脚	用途
myBoardLED0_GPIO	LED5	指示EPWM占空比的变化
ADCINA4	66	用于AD采样
DACA	70	DAC
CMPSS	--	比较器
EPWM	--	产生PWM

# 系统集成

片上资源	PIN脚	用途
myBoardLED0_GPIO	LED5	指示EPWM占空比的变化
ADCINA4	66	用于AD采样
DACA	70	DAC
CMPSS	--	比较器
EPWM	--	产生PWM

The screenshot shows the TI Pin Configurator interface for a LAUNCHPAD F28P55X (12). The left sidebar lists various hardware resources, with LED5 highlighted in a red box. The main panel shows the configuration for myBoardLED0\_GPIO on pin LED5, with the name field also highlighted in a red box. The configuration includes:

- Name: myBoardLED0\_GPIO
- Use Hardware: LED5
- Analog Mode: Pin is in digital mode
- GPIO Direction: Pin is a GPIO output
- Pin Type: Push-pull output/floating input
- Qualification Mode: Synchronization to SYSCLK
- External Interrupts: Connect to an XINT for interrupts
- Core Select: CPU1 selected as controller core
- Write Initial Value:
- PinMux: Peripheral and Pin Configuration

# 系统集成

片上资源	PIN脚	用途
myBoardLED0_GPIO	LED5	指示EPWM占空比的变化
ADCINA4	66	用于AD采样
DACA	70	DAC
CMPSS	--	比较器
EPWM	--	产生PWM

The screenshot displays the TI Configurator interface for configuring an ADC. The left sidebar shows the component tree with 'ADC' selected under 'ANALOG (6)'. The main configuration area shows 'myADCA' with various settings. The 'SOC Configurations' section is expanded to show 'SOC0 Start of Conversion 0' settings. Red boxes highlight the following configuration values:

- myADCA
- ADC Instance
- ADCCLK = (input clock) / 4.0
- SOC/EOC number 0
- SOC0 Channel: single-ended, ADCINA4
- SOC0 Trigger: ePWM1, ADCSOCA
- SOC0 Interrupt Trigger: ADCINT1 will trigger the SOC
- SOC0 Sample Window [SYSCLK counts]: 15

# 系统集成

片上资源	PIN脚	用途
myBoardLED0_GPIO	LED5	指示EPWM占空比的变化
ADCINA4	66	用于AD采样
DACA	70	DAC
CMPSS	--	比较器
EPWM	--	产生PWM

The screenshot shows the TI Studio configuration interface for the ADC peripheral. The left sidebar lists various system components, with 'ADC' selected under the 'ANALOG (6)' category. The main configuration area is divided into several sections, with key settings highlighted by red boxes:

- ADC Interrupt Pulse Mode:** 'ADCINT1 interrupt' is selected.
- Register PIE Interrupt Handlers:** 'Interrupt 1' is checked.
- ADCA Interrupt 1:** The name is 'myADCA1\_INT' and the interrupt handler is 'INT\_myADCA\_1\_ISR'. The 'Enable interrupt in PIE' checkbox is checked.
- Analog PinMux:** The name is 'myANALOGPinMux0' and the mode is set to 'CUSTOM'.
- PinMux - Peripheral and Pin Configuration:** The peripheral is set to 'Any(A0, B15, C15, DACA\_OUT/23 (Header))'.

# 系统集成

片上资源	PIN脚	用途
myBoardLED0_GPIO	LED5	指示EPWM占空比的变化
ADCINA4	66	用于AD采样
DACA	70	DAC
CMPSS	--	比较器
EPWM	--	产生PWM

The screenshot shows the TI Studio configuration environment for a DAC. On the left, a component tree lists various peripherals, with 'DAC' under the 'ANALOG' category highlighted with a red box. The main workspace displays the configuration for 'myDACA'. Several fields are highlighted with red boxes: 'Name' is set to 'myDACA'; 'DAC Instance' is set to 'DACA'; 'Reference Voltage' is set to 'ADC VREFHI reference voltage'; 'Gain Mode' is set to 'Gain set to 2'; 'Load Mode' is set to 'Load on next SYSCLK'; 'Enable Output' is checked; 'DAC Device Pin Name' is set to '23: A0/ B15/ C15/ DACA\_OUT'; 'Analog PinMux' is set to 'myANALOGPinMux0'; 'Use Case' is set to 'CUSTOM'; 'Pins Used' is set to 'A0, B15, C15, DACA\_OUT, A4, B8'; and 'PinMux - Peripheral and Pin Configuration' is set to 'Any(ANALOG)'. Other options include 'Any(A0, B15, C15, DACA\_OUT/23 (Header))' and 'Any(A4, B8/36 (Header))'.

# 系统集成

片上资源	PIN脚	用途
myBoardLED0_GPIO	LED5	指示EPWM占空比的变化
ADCINA4	66	用于AD采样
DACA	70	DAC
CMPSS	--	比较器
EPWM	--	产生PWM

Software > ASYSCTL

ASYSCTL

Temperature Control

Enable Temperature Sensor

Lock Temperature Sensor Control Register

Analog Reference

Analog Reference **Internal**

Analog Reference Voltage **1.65V**

External DACL Enable

CMPSS DACL Output Enable

# 系统集成

片上资源	PIN脚	用途
myBoardLED0_GPIO	LED5	指示EPWM占空比的变化
ADCINA4	66	用于AD采样
DACA	70	DAC
CMPSS	--	比较器
EPWM	--	产生PWM

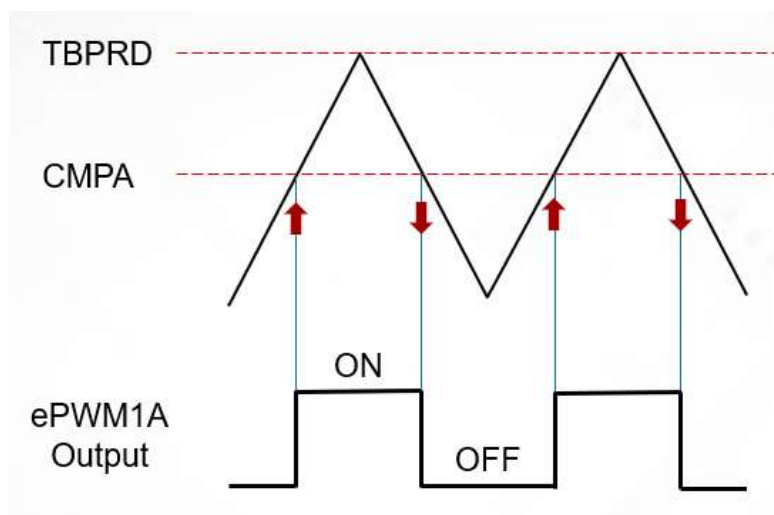
The screenshot displays the TI Configurator interface for configuring the myCMPSS module. The left sidebar shows the system tree with 'CMPSS' highlighted under the 'ANALOG' section. The main configuration area shows 'myCMPSS' settings, including 'CMPSS instance' set to 'CMPSS2', 'Enable module' checked, and 'Blanking Signal' set to 'EPWM1BLANK'. The 'High Comparator Configuration' section shows 'Negative input source' set to 'input driven by internal DAC' and 'Asynchronous comparator output drives CTRIP' set to 'Asynchronous comparator output drives CTRIP' with a value of '2500'. The 'Digital Filter Configuration' and 'Ramp Generator Configuration' sections are also visible.



# 系统集成

片上资源	PIN脚	用途
myBoardLED0_GPIO	LED5	指示EPWM占空比的变化
ADCINA4	66	用于AD采样
DACA	70	DAC
CMPSS	--	比较器
EPWM	--	产生PWM

$$\text{Time Base Period} = \frac{f_{tblck}}{2f_{pwm}} = \frac{100 \times 10^6}{2 \times 50000} = 1000$$



The screenshot shows the TI Configurator interface for configuring an EPWM module. The left sidebar shows the component tree with 'EPWM' selected. The right pane displays the configuration for 'myEPWM1'. Several settings are highlighted with red boxes:

- Name:** myEPWM1
- Time Base Period:** 1000
- Counter Mode:** Up-down-count mode
- Counter Compare A (CMPA):** 500

# 系统集成

片上资源	PIN脚	用途
myBoardLED0_GPIO	LED5	指示EPWM占空比的变化
ADCINA4	66	用于AD采样
DACA	70	DAC
CMPSS	--	比较器
EPWM	--	产生PWM

The screenshot displays the TI Configurator interface for configuring the EPWM module. The left sidebar shows the project structure with 'EPWM' selected. The main configuration area is divided into sections for ePWMxA and ePWMxB. Red boxes highlight the following configurations:

- ePWMxA Event Output Configuration:** The 'Set output pins to High' and 'Set output pins to Low' options are selected for the event outputs.
- EPWM Trip Zone:** The 'Low voltage state' is selected for the TZA Event.
- EPWM Trip Zone:** The 'One-shot DCAEVT1' is selected for the DCAEVT1 Event.

# 系统集成

片上资源	PIN脚	用途
myBoardLED0_GPIO	LED5	指示EPWM占空比的变化
ADCINA4	66	用于AD采样
DACA	70	DAC
CMPSS	--	比较器
EPWM	--	产生PWM

The screenshot shows the TI Studio configuration window for EPWM. The left sidebar lists various hardware modules, with EPWM highlighted in red. The main configuration area is divided into several sections:

- General Settings:** Includes Trip 4 (set to Trip 4), Trip 1 (set to None), and Event when DCxH high (set to Event is disabled).
- DCBEVT1 and DCBEVT2:** Includes DC filter signal source (set to DCAEVT1).
- EPWM Event-Trigger:** Includes Enable EPWM interrupt (unchecked).
- ADC SOC Trigger:** Includes SOCA Trigger Enable (checked), SOCA Trigger Source (set to Time-base counter equal to CMPA when the timer is incrementing), SOCA Trigger Event Count (set to 1 Event Generates Interrupt), SOCA Trigger Event Count Initial Value Load Enable (unchecked), and SOCB Trigger Enable (unchecked).