

PSI3441 – Arquitetura de Sistemas Embarcados

SysTick – Contador da CPU

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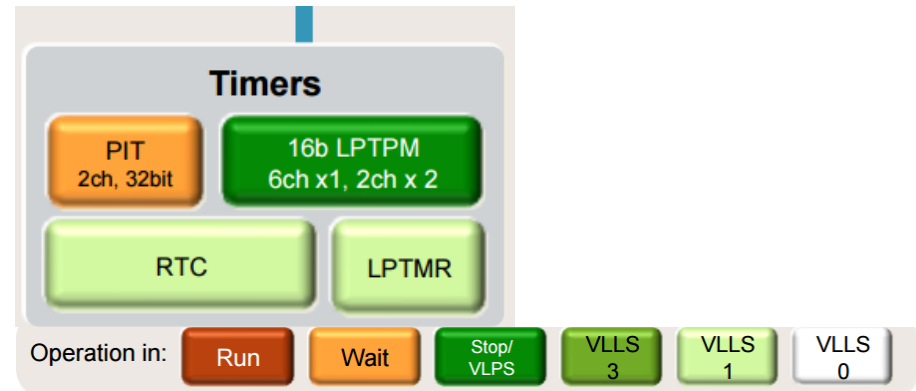
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Timers no KL25Z

- PIT - Periodic Interrupt Timer
 - Gera interrupções periódicas.
- TPM - Timer/PWM Module
 - Conectado a portas de I/O; possui input capture, output compare, pode gerar sinais de PWM; pode gerar interrupções.
- LPTMR - Low-Power Timer
 - Pode operar como timer ou contador in todos os modos de potência; pode “acordar” o sistema com interrupções; pode sincronizar o hardware.
- Real-Time Clock
 - Alimentado por um cristal externo de 32.768 kHz; rastreia tempo em segundos utilizando um registrador de 32 bits; pode gerar um alarme; pode gerar um sinal de 1 Hz e/ou uma interrupção; pode “acordar o sistema com interrupção.
- SYSTICK
 - Parte do Cortex M0+ Core; contador que pode gerar interrupções





System Tick Timer

- Ação executada periodicamente
- 24-bit down counter
- Clock da CPU ou Clock/16

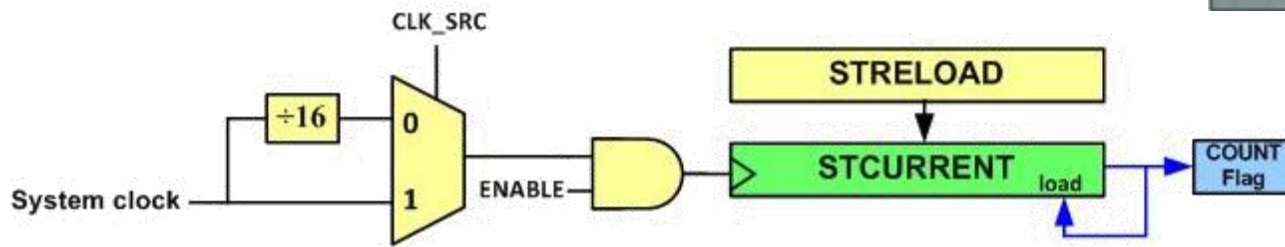


Figure 5-7: System Tick Timer Internal Structure

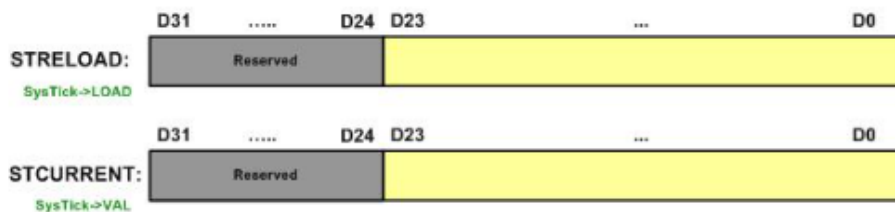
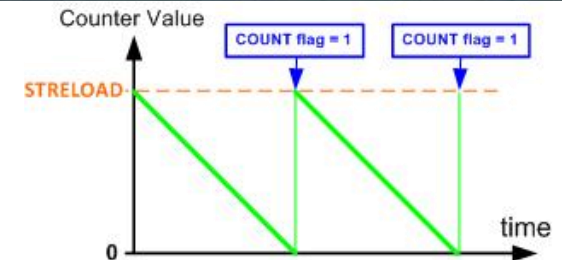
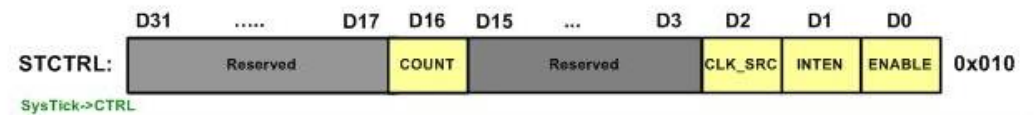


Figure 5-10: STRELOAD vs. STCURRENT



bit	Name	Description
0	ENABLE	Enable (0: the counter is disabled, 1: enables SysTick to begin counting down)
1	INTEN	Interrupt Enable 0: Interrupt generation is disabled, 1: when SysTick counts to 0 an interrupt is generated
2	CLK_SRC	Clock Source 0: System clock divided by 16 1: System clock
16	COUNT	Count Flag 0: the SysTick has not counted down to zero since the last time this bit was read 1: the SysTick has counted down to zero <i>Note: this flag is cleared by reading the STCTRL or writing to STCURRENT register.</i>

Figure 5-8: STCTRL (System Tick Control)



SysTick Contador CodeWarrior (Processor Expert)

- ▼ SysTick:Init_SysTick
 - ISR Name of INT_SysTick
 - Init
 - ▼ PDD
 - SysTick_PDD_ClearInterruptFlag
 - SysTick_PDD_DisableInterrupt
 - SysTick_PDD_EnableDevice
 - SysTick_PDD_EnableInterrupt
 - SysTick_PDD_GetClkSource
 - SysTick_PDD_GetEnableDeviceStatus
 - SysTick_PDD_GetInterruptFlag
 - SysTick_PDD_GetInterruptMask
 - SysTick_PDD_ReadCalibrationReg
 - SysTick_PDD_ReadControlStatusReg
 - SysTick_PDD_ReadCurrentValueReg
 - SysTick_PDD_ReadReloadValueReg
 - SysTick_PDD_SetClkSource
 - SysTick_PDD_WriteControlStatusReg
 - SysTick_PDD_WriteCurrentValueReg
 - SysTick_PDD_WriteReloadValueReg

Component Inspector - SysTick Components Library

Properties Methods Clock Diagram

Name	Value	Details
Component name	SysTick	
Device	SysTick	SysTick
▼ Settings		
Clock source	Processor clock	
Reload value	16777215	D
Counter period	1.000 s	
▼ Interrupts		
Interrupt	INT_SysTick	INT_SysTick
Interrupt priority	0 (Highest)	
ISR Name		
Timer interrupt	Disabled	
▼ Initialization		
Timer enable	yes	
Clear counter	yes	
Call Init method	yes	

Valor do Contador

Habilitar o SysTick

Arrastar para o main.c

```
#include "SysTick_PDD.h"
int ti=0;
ti= SysTick_PDD_ReadCurrentValueReg(SysTick_DEVICE); //lê o valor do contador
```