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/* PWM LED Control with 75% Duty Cycle on PF3 (M1PWM7) - TM4C123G */
#include <stdint.h>
#include "inc/tm4c123gh6pm.h"

void delayMs(int n);

int main(void)
{
    uint32_t period = 16000;    // PWM period (for ~1 kHz with /64 divider)
    uint32_t duty   = (period * 75) / 100; // 75% duty cycle

    /* Enable Peripheral Clocks */
    SYSCTL_RCGCPWM_R |= 0x02;           /* Enable clock to PWM1 */
    SYSCTL_RCGCGPIO_R |= 0x20;          /* Enable clock to PORTF */
    SYSCTL_RCC_R |= (1<<20);          /* Enable PWM clock divider */
    SYSCTL_RCC_R = (SYSCTL_RCC_R & ~0x000E0000) | 0x00060000; /* Divide by 64 */

    /* Configure PF3 for M1PWM7 */
    GPIO_PORTF_AFSEL_R |= 0x08;          /* PF3 uses alternate function */
    GPIO_PORTF_PCTL_R &= ~0x0000F000;
    GPIO_PORTF_PCTL_R |= 0x00005000; /* Set PF3 as M1PWM7 */
    GPIO_PORTF_DEN_R |= 0x08;            /* Enable PF3 digital function */
    GPIO_PORTF_DIR_R |= 0x08;            /* Set PF3 as output */

    /* Configure PWM1 Generator 3, output 7 */
    PWM1_3_CTL_R = 0;                  /* Stop counter */
    PWM1_3_GENB_R = 0x0000008C;        /* Set when reload, clear when match A */
    PWM1_3_LOAD_R = period - 1;        /* Set period for PWM frequency */
    PWM1_3_CMPA_R = duty;              /* Set duty cycle = 75% */
    PWM1_3_CTL_R = 1;                  /* Enable generator */
    PWM1_ENABLE_R |= 0x80;             /* Enable M1PWM7 output */

    while(1)
    {
        /* LED ON (PWM active with 75% duty cycle) */
        PWM1_ENABLE_R |= 0x80; // Enable PWM output
        delayMs(2000);

        /* LED OFF (PWM disabled) */
        PWM1_ENABLE_R &= ~0x80; // Disable PWM output
        delayMs(2000);
    }
}

/* Delay n milliseconds (16 MHz CPU clock) */
void delayMs(int n)
{
    int i, j;
    for(i = 0; i < n; i++)
        for(j = 0; j < 3180; j++) {}
}

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