

On-Chip Peripheral Program Example

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Description

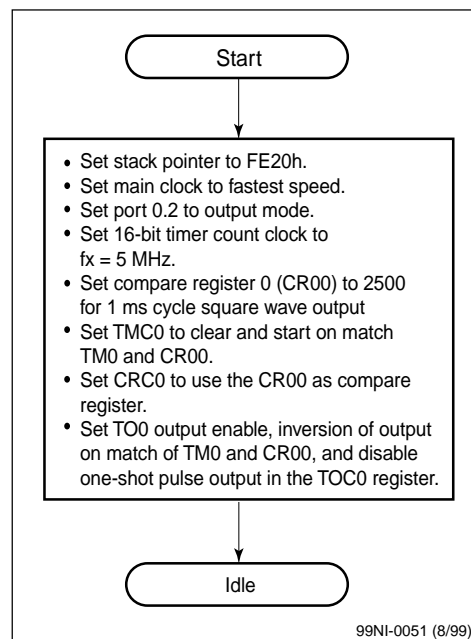
The 16-bit timer/event counter 0 (TM0) in the μ PD7805x/78005x subseries can be used for an interval timer, external event counter, pulse-width modulator output, square-wave output, one-shot pulse output or pulse-width measurement.

This program demonstrates the 16-bit timer/event counter in square-wave output mode. Timer output 0 (TO0) toggles each time the value in the 16-bit TM0 register matches the count value preset in the CR00 capture/compare register 0.

Program Specifications

- ❑ Timer count clock: 5 MHz
- ❑ Square-wave interval: 500 μ s
- ❑ Square-wave frequency: 1 kHz
- ❑ Pins used in program: TO0/P30 (toggles every 500 μ s)

Block Diagram



Assembly Language Program

```

;*****
; Date:          07/19/1999
;
; Parameters:   - Fastest CPU clock
;                (fx = 5.00 MHz, 1 CPU clock cycle = 200 ns
;                - Square-wave cycle: 1 ms (1 kHz)
;                - Timer count clock: fx = 5.0 MHz
;                - Output port:          T00/P30
;
;*****

;=====
;=      Specify Interrupt Vectors      =
;=====
Res_Vec  CSEG AT 0000h          ; Set main program start vector
        DW  Start

;=====
;=      Main Program                    =
;=====
MAIN     CSEG
Start:   DI                    ; Disable interrupts
        MOVW    AX, #0FE20h    ; Load SP address
        MOVW    SP, AX        ; Set Stack Pointer

        MOV     OSMS,#01h      ; Don't use scaler
        MOV     PCC, #00h      ; Main system clock at fastest setting

        CLR1    P3.0           ; Set port 3.0 latch to low
        CLR1    PM3.0          ; Set port 3.0 to output mode

        MOV     TCL0,#020h     ; Select counter clock to fx = 5 MHz
        MOVW    CR00,#2500     ; Set Compare register to 2500
                                ; 1 ms square-wave output
        MOV     TMC0,#0Ch      ; Set to clear and start on match TM0 and CR00
        CLR1    CRC0.0         ; Set CR00 operation to compare register
        MOV     TOC0,#03h      ; Set T00 output enable, inversion of
                                ; output on match of TM0 and CR00,
                                ; and disable ONE-SHOT mode

Loop1:   BR     $Loop1         ; Endless loop

        END

```

C Language Program

```

/*****
; Date:          07/19/1999
;
; Parameters: - Fastest CPU clock
;              (fx = 5.00 MHz, 1 CPU clock cycle = 200 ns
;              - Square-wave cycle: 1 ms (1 kHz)
;              - Timer count clock: fx = 5.0 MHz
;              - Output port:      T00/P30
;
; *****/

/* extension functions in K0/K0S compiler */

#pragma sfr          /* key word to allow SFR names in C code */
#pragma asm          /* key word to allow ASM statements in C code */
#pragma DI           /* key word for DI instruction in C code */

/*=====
;      Constants/Variables          =
;=====*/
#define TRUE         1
#define FALSE        0

/*=====
;      Main Program                  =
;=====*/
void main(void)
{
    OSMS = 0x01;      /* Don't use scaler */
    PCC = 0x00;       /* Main system clock at fastest setting */

    P3.0 = 0;         /* Latch port 3.0 low */
    PM3.0 = 0;        /* Set port 3.0 as output */
    TCL0 = 0x20;       /* Select counter clock to fx = 5 MHz) */
    CR00 = 2500;       /* Set compare register to 2500 for
                        1 ms square-wave output */
    TMC0 = 0x0C;       /* Set to clear & start on match TM0 and CR00 */
    CRC0.0 = 0;        /* set CR00 operation to compare register */
    TOC0 = 0x03;       /* Set T00 output enable, Inversion of output on
                        match of TM0 & CR00, and disable ONE-SHOT mode*/

    while(TRUE);      /* Endless loop */
}                    /* End of function main() */

```



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