Timer/WDT Driver Sample Code Reference Guide

V1.00.001

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Support Chips:

ISD9160

Support Platforms:

NuvotonPlatform_Keil

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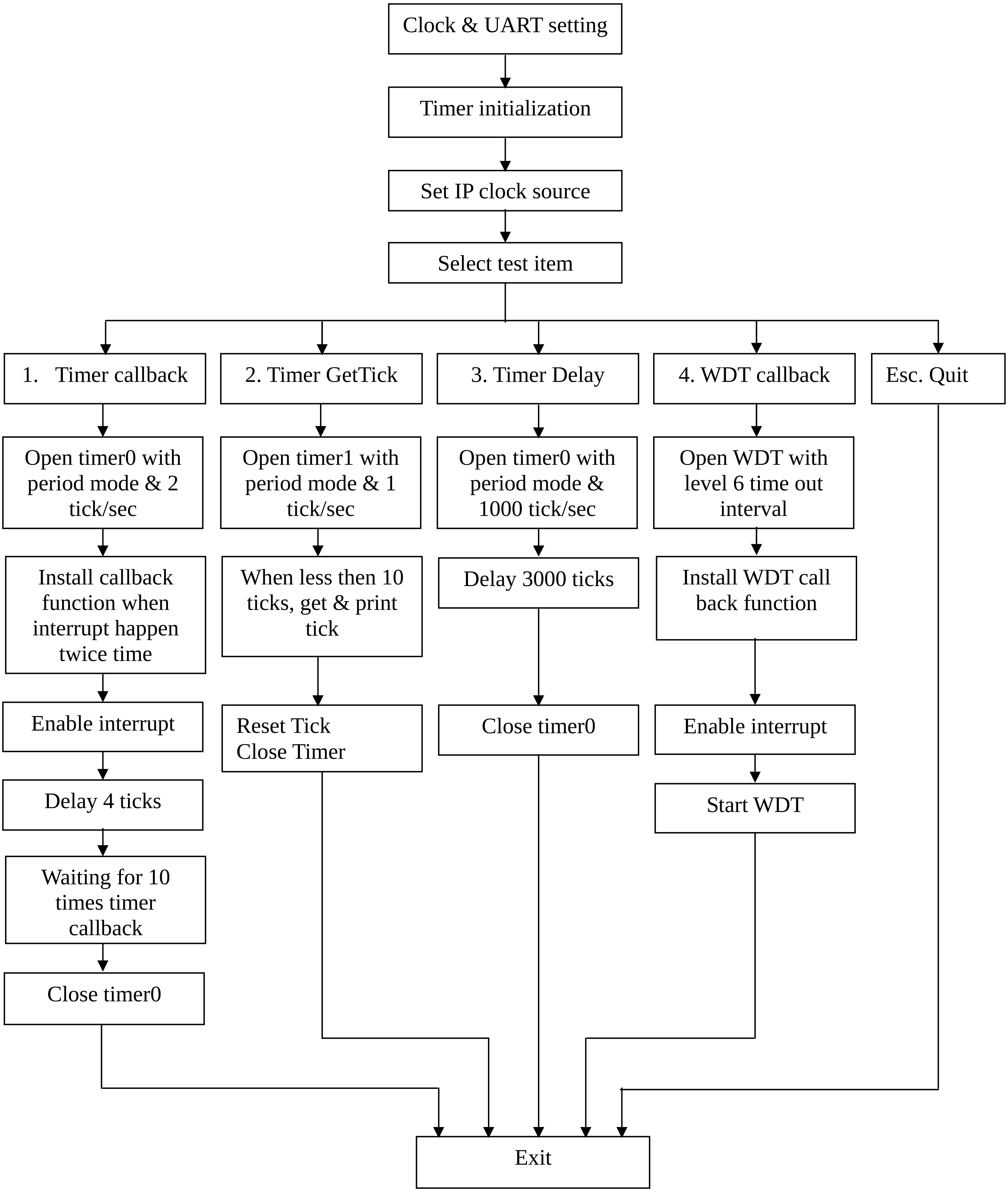
1 Introduction

This sample code will demo Timer IP on ISD9160 chip.

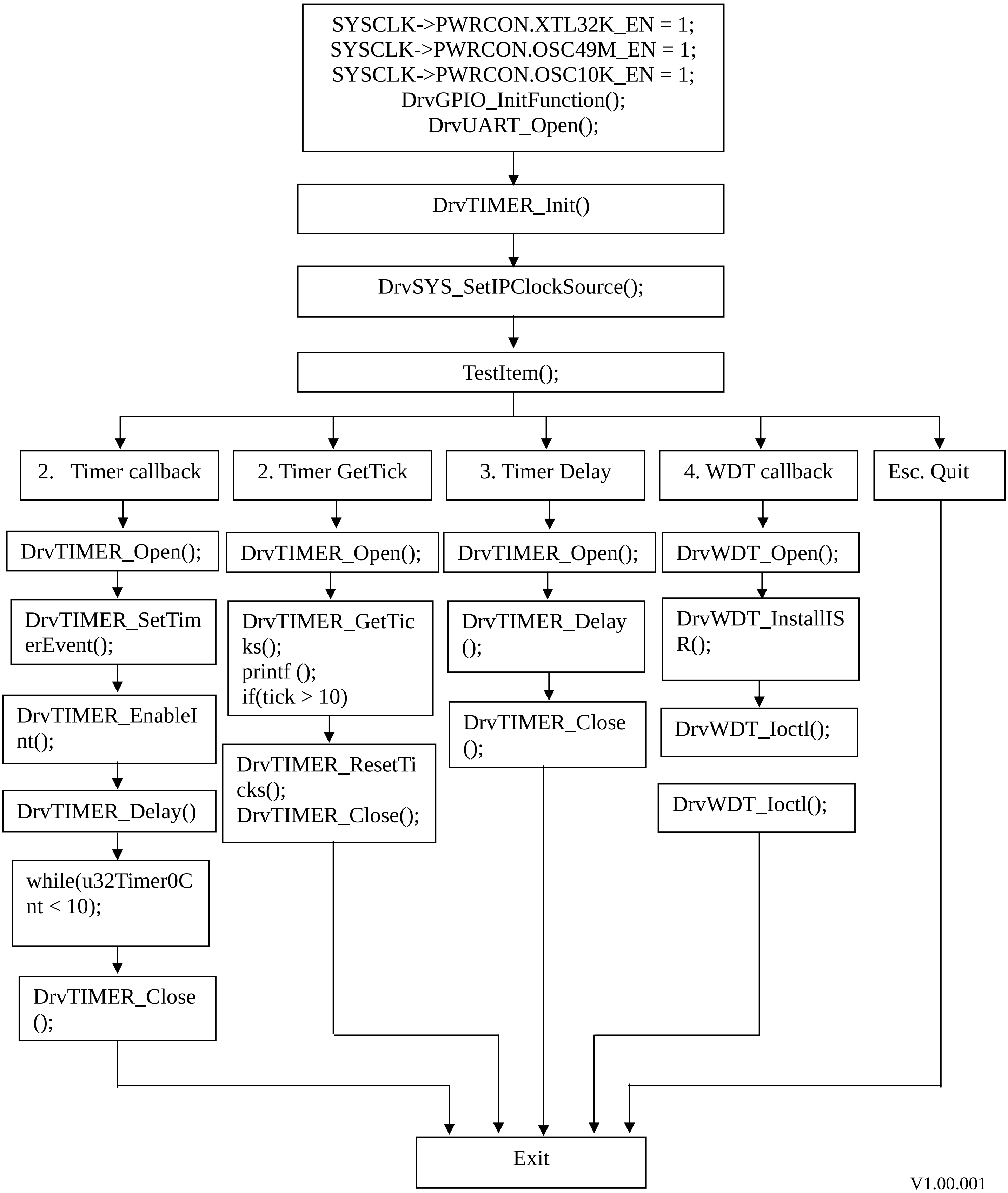
1.1 Feature

- This sample use Timer0, Timer1 and Select Timer sample case.
- Case 1: Test Timer0 callback function; Case 2: Test Timer1 GetTick function; Case 3: Test Timer0 delay; Case 4: Test WatchDog Timer function.
- When Timer time out interrupt occurs, print interrupt occurs times with Semi Host.

2 Block Diagram


Clock & UART setting
Timer initialization
Set IP clock source
Select test item
1. Timer callback
2. Timer GetTick
3. Timer Delay
4. WDT callback
Esc. Quit
Open timer0 with period mode & 2 tick/sec
Open timer1 with period mode & 1 tick/sec
Open timer0 with period mode & 1000 tick/sec
Open WDT with level 6 time out interval
Install callback function when interrupt happen twice time
When less then 10 ticks, get & print tick
Delay 3000 ticks
Install WDT call back function
Enable interrupt
Reset Tick
Close Timer
Close timer0
Enable interrupt
Delay 4 ticks
Start WDT
Waiting for 10 times timer callback
Close timer0
Exit

3 Calling Sequence



4 Code Section –Smpl_DrvTimer.c

```
/*---------------------------------------------------------------------------------------------------------*/
/*                                                                                                         */
/* Copyright(c) 2011 Nuvoton Technology Corp. All rights reserved.                                         */
/*                                                                                                         */
/*---------------------------------------------------------------------------------------------------------*/
#include <stdio.h>

/*---------------------------------------------------------------------------------------------------------*/
/*    Include hear file                                                                                    */
/*---------------------------------------------------------------------------------------------------------*/

#include "ISD9xx.h"
#include "Driver/DrvTimer.h"
#include "Driver/DrvUART.h"
#include "Driver/DrvGPIO.h"
#include "Driver/DrvSYS.h"

volatile uint8_t b8WDTINT = FALSE;

/*---------------------------------------------------------------------------------------------------------*/
/*    Sample Code Menu                                                                                     */
/*---------------------------------------------------------------------------------------------------------*/
static void TestItem (void)
{
        printf("\n\n");
        printf("+----------------------------------------------------------+\n");
        printf("|                          Timer Sample Program             |\n");
        printf("+----------------------------------------------------------+\n");
        printf("| Timer Callback                                    - [1] |\n");
        printf("| Timer GetTick                                     - [2] |\n");
        printf("| Timer Delay                                       - [3] |\n");
        printf("| WDT Callback                                      - [4] |\n");
        printf("+----------------------------------------------------------+\n");
        printf("| Quit                                            - [ESC] |\n");
        printf("+----------------------------------------------------------+\n");
        printf("Select key : ");

}

/*---------------------------------------------------------------------------------------------------------*/
/*    Callback funtion                                                                                     */
/*---------------------------------------------------------------------------------------------------------*/
volatile uint32_t u32Timer0Cnt = 0;
```

```
void TMR_Callback()
{
          printf("Timer callback #%d, ticks %d\n", u32Timer0Cnt++, DrvTIMER_GetTicks(TMR0));
}

void WDT_Callback()
{
        b8WDTINT = TRUE;

        DrvWDT_Ioctl(E_WDT_IOC_RESET_TIMER, 0);
        printf("    \n");
        printf("    WDT interrupt !!!\n");
        printf("    \n");


        DrvWDT_Close();
}


void SysTimerDelay(uint32_t us)
{
        SysTick->LOAD = us * 48;
        SysTick->VAL     =    (0x00);
        SysTick->CTRL = (1 << SYSTICK_CLKSOURCE) | (1<<SYSTICK_ENABLE);

        /* Waiting for down-count to zero */
        while((SysTick->CTRL & (1 << 16)) == 0);
}


/*---------------------------------------------------------------------------------------------------------*/
/*    MAIN function                                                                                          */
/*---------------------------------------------------------------------------------------------------------*/

int main (void)
{
        int32_t tick;
        int8_t item;
        STR_UART_T param;

        UNLOCKREG();

        SYSCLK->PWRCON.XTL32K_EN = 1;
        SYSCLK->PWRCON.OSC49M_EN = 1;
        SYSCLK->PWRCON.OSC10K_EN = 1;
        SYSCLK->CLKSEL1.WDG_S = 2;
```

```
SysTimerDelay(5000);

DrvGPIO_InitFunction(FUNC_UART0);

param.u32BaudRate           = 115200;
param.u8cDataBits           = DRVUART_DATABITS_8;
param.u8cStopBits           = DRVUART_STOPBITS_1;
param.u8cParity             = DRVUART_PARITY_NONE;
param.u8cRxTriggerLevel     = DRVUART_FIFO_62BYTES;
param.u8TimeOut             = 0;
DrvUART_Open(UART_PORT0, &param);

DrvTIMER_Init();
printf(" TIMER Sample Code \n");

DrvSYS_SetIPClockSource(E_SYS_TMR0_CLKSRC,2);
DrvSYS_SetIPClockSource(E_SYS_TMR1_CLKSRC,2);

do
{
    TestItem();
    item = getchar();
    printf("%c\n",item);
    switch(item)
    {
        case '1':
        {
            u32Timer0Cnt = 0;

            /* Using TIMER0 PERIODIC_MODE , 2 tick /sec */
            DrvTIMER_Open(TMR0,2,PERIODIC_MODE);

            /* Install Callback function "call_back"   when Interrupt happen twice time */
            DrvTIMER_SetTimerEvent(TMR0,2, (TIMER_CALLBACK)TMR_Callback,0);

            /* Enable TIMER0 Intettupt */
            DrvTIMER_EnableInt(TMR0);

            /* Waiting for first timer callback */
            while(u32Timer0Cnt == 0);

            printf("    --------------------- [Delay for 4 ticks ] ---------------------\n");
            /* Delay 4 ticks*/
            DrvTIMER_Delay(4);
            printf("    --------------------- [    Delay times up    ] ---------------------\n");
            printf("    Waiting for 10 times timer callbacks ...\n");
            while(u32Timer0Cnt < 10);



            /* Close TIMER0 */
            DrvTIMER_Close(TMR0);

            printf("Case 1 Finished \n");

            break;
        }
        case '2':
        {
            DrvTIMER_Open(TMR1,1,PERIODIC_MODE);
            tick = 0;
            do
            {

                if(tick != DrvTIMER_GetTicks(TMR1))            /* print when 10 multiple    */
                {
                    tick = DrvTIMER_GetTicks(TMR1);
                    printf ("tick = %d \n", tick);
                    if(tick > 10) break;
                }

            }while(1);
            tick = 0;
            DrvTIMER_ResetTicks(TMR1);
            DrvTIMER_Close(TMR1);
            printf("Case 2 Finished \n");
            break;
        }
        case '3':
        {
            printf(" Delay for 3 seconds ...\n");
            DrvTIMER_Open(TMR0,1000,PERIODIC_MODE);       /* Timer Basic Operation */
            DrvTIMER_Delay(3000);
            DrvTIMER_Close(TMR0);

            printf("Case 3 Finished \n");
            break;
        }
```

```
            case '4':
            {

                printf("WDT Callback Function Test\n");
                printf("WDT interval: LEVEL6\n");

                b8WDTINT = FALSE;
                DrvWDT_Open(E_WDT_LEVEL6);
                DrvWDT_InstallISR((WDT_CALLBACK)WDT_Callback);
                DrvWDT_Ioctl(E_WDT_IOC_ENABLE_INT, 0);

                DrvWDT_Ioctl(E_WDT_IOC_START_TIMER, 0);

                while (1)
                {
                    if ( b8WDTINT )
                        break;
                }

                printf("Case 4 Finished.\n");

                break;
            }

            default:
            {
                break;
            }
        }
    }while(item != 27);

    printf("\nExit TIMER Sample Code ...\n");

    return 0;
}
```

5 Execution Environment Setup and Result

- Prepare a ISD9160 board.
- Compile the sample code.
- Console window show result of Timer callback, get tick, delay function and Watch Dog interrupt function.

6 Revision History

Version	Date	Description
V1.00.01	Sep. 2011	Created