Pending IRQ On WakeUp

Example Code Introduction for 32-bit NuMicro® Family

Information

Application	Use TIMER to wake up the system and pending the interrupt service, first execute the main program
BSP Version	M051 Series BSP CMSIS v3.01.002
Hardware	NuTiny-EVB-M051_V3.0

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1 Function Description

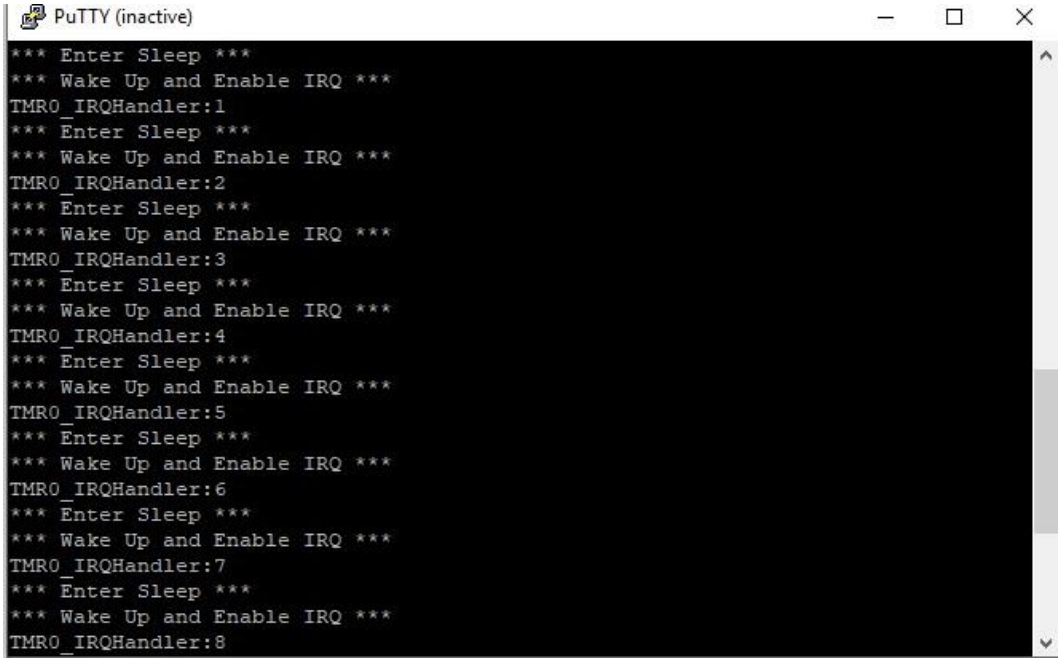
1.1 Introduction

Under normal circumstances, when the power saving mode is woken up, it will first enter the interrupt service routine, and then execute the part of the main program that has not been executed after the wakeup. This example is an instruction provided by ARM, which allows the system to delay entering the interrupt service after the power-saving mode is woken up, execute the main program first, and then execute the interrupt service routine.

1.2 Principle

First, set the counter count interrupt mode and interrupt wake-up of the TIMER0. After the TIMER0 is turned on, use the ARM-provided disable interrupt instruction, and then the system enters the power-saving mode. Wait for the TIMER0 to count until the interrupt is generated. After the system wakes up, use the ARM-provided enable interrupt instruction to enter the interrupt service routine.

1.3 Demo Result



2 Code Description

TIMER interrupt service routine, clear interrupt flag and wake-up flag, print out the number of times to enter the interrupt service routine：

```
void TMR0_IRQHandler(void)
{
    if (TIMER_GetIntFlag(TIMER0) == 1)
    {
        /* Clear Timer0 time-out interrupt flag */
        TIMER_ClearIntFlag(TIMER0);
        TIMER_ClearWakeupFlag(TIMER0);

        g_au32TMRINTCount[0]++;
        printf("TMR0_IRQHandler:%d\n", g_au32TMRINTCount[0]);
    }
}
```

Set the TIMER function and the corresponding interrupt service routine to wake up the system：

```
/* Open Timer0 frequency to 1 Hz in periodic mode, and enable interrupt */
TIMER_Open(TIMER0, TIMER_PERIODIC_MODE, 1);
TIMER_EnableInt(TIMER0);
TIMER_EnableWakeup(TIMER0);
/* Enable Timer0 NVIC */
NVIC_EnableIRQ(TMR0_IRQn);
/* Start Timer0 counting */
TIMER_Start(TIMER0);
```

Use the interrupt service switch instruction and print out the point in time when the program is executed：

```
    __disable_irq();

    printf("*** Enter Sleep ***\n");
    UART_WAIT_TX_EMPTY(UART0);
    CLK_PowerDown();

    printf("*** Wake Up and Enable IRQ ***\n");
    __enable_irq();
```

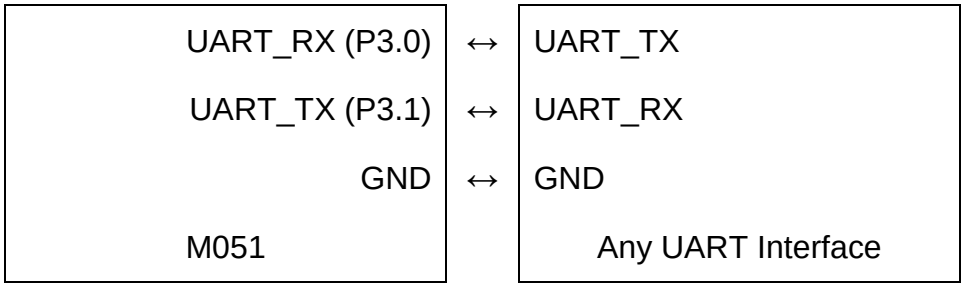
3 Software and Hardware Environment

Software Environment

- BSP version
  - M051 Series BSP CMSIS v3.01.002
- IDE version
  - Keil uVersion 5.26

Hardware Environment

- Circuit components
  - NuTiny-EVB-M051_V3.0
- Diagram



4 Directory Information

EC_M051_Pending_IRQ_On_WakeUp_V1.00	
Library	Sample code header and source files
CMSIS	Cortex® Microcontroller Software Interface Standard (CMSIS) by Arm® Corp.
Device	CMSIS compliant device header file
StdDriver	All peripheral driver header and source files
SampleCode	
ExampleCode	Source file of example code

5 How to Execute Example Code

1. Browsing into sample code folder by Directory Information (section 4) and double click M051_Pending_IRQ_On_WakeUp.uvproj.
2. Enter KEIL compile mode
   a. Build
   b. Download
   c. Start/Stop debug session
3. Enter debug mode
   a. Run

6 Revision History

Date	Revision	Description
Aug. 30, 2019	1.00	1. Initially issued.

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