NUC240 Power Down Wakeup

Example Code Introduction for 32-bit NuMicro® Family

Information

Application	This example code is implement NUC240 using GPIO to wake up the MCU and enter the Power Down Wakeup interrupt.
BSP Version	NUC230_240_Series_BSP_CMSIS_V3.01.001
Hardware	NuTiny-EVB-NUC240 V1.2

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1 Function Description

When NUC240 enters Power Down mode the chip can be woken up by changing of the GPIO status. After waking up NUC240 first enters the PDWU interrupt and then enters the GPIO interrupt subroutine. Since the source of the Power Down wakeup with the priority. If the interrupt source priority is same level, the peripheral hardware interrupt will be executed first. If you want the Power Down wakeup interrupt to be response first, you can change the Power Down wakeup interrupt priority to higher level.

2 Code Description

(1) After initializing NUC240 define PB3 to input mode and enable GPIO interrupt setting as the falling edge to trigger.
(2) Enable PDWU interrupt.
(3) Enter Power Down mode and wait for the falling edge of PB3

```
int main(void)
{
    /* Unlock protected registers */
    SYS_UnlockReg();

    /* Init System, peripheral clock and multi-function I/O */
    SYS_Init();

    /* Init UART0 for printf */
    UART0_Init();

    /* Configure PB.3 as Input mode and enable interrupt by falling edge trigger */
    GPIO_EnableInt(PB, 3, GPIO_INT_FALLING);
    NVIC_EnableIRQ(GPAB_IRQn);

    CLK->PWRCON |= CLK_PWRCON_PD_WU_INT_EN_Msk;  /* Enable wake up interrupt source */
    NVIC_EnableIRQ(PWRWU_IRQn);            /* Enable IRQ request for PDWU interrupt */

    NVIC_SetPriority(PWRWU_IRQn,0);
    NVIC_SetPriority(GPAB_IRQn,3);
    /* Waiting for PB.3 falling-edge interrupt event */
    while(1) {
       UART_WAIT_TX_EMPTY(UART0);
       CLK_PowerDown();
    }
```

3 Hardware and Software environment

Software Environment

- BSP Version
  - NUC230_240_Series_BSP_CMSIS_Rev3.01.001
- Project Name
  - PD_INT_Wakeup.uvproj

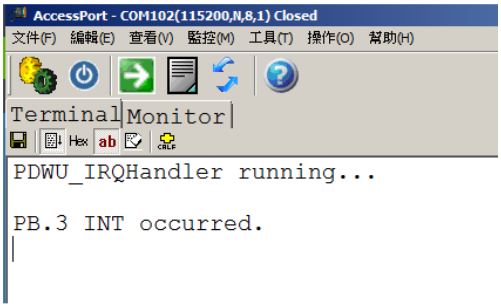
Hardware Environment

- Circuit component
  - NuTiny-EVB-NUC240 V1.2
- Diagram

UART_RX0 (PB.0)	↔	PB5/TX1(Orange wire)
UART_TX0 (PB.1)	↔	PB4/RX1(Brown wire)
GND	↔	GND(Black wire)
NuTiny-SDK-NUC240		Nu-Bridge

Based on the nutiny-SDK-NUC240 development board, UART_RX0 (PB.0), UART_TX0 (PB.1) are connected to Nu-Bridge, and messages are printed from UART0.

Open Windows “System Manager”, find the nubridge Virtual Com Port (COMX). Find the terminal then setting Baud rate with 115200. Executing the program, find the following message.



NUC240 will wake up when PB3 is connected to the GND. Then NUC240 will first enter the PDWU interrupt subroutine and then enter the GPIO interrupt subroutine.

4 Directory Information

- EC_NUC240_PD_INT_Wakeup_V1.00
  - Library: NUC240 Sample code header and source files.
    - CMSIS: Cortex® Microcontroller Software Interface Standard (CMSIS) V3.01.
    - Device: CMSIS compliant device header file.
    - StdDriver: All peripheral driver header and source files.
  - SampleCode
    - ExampleCode: Example code source file.

5 How To Execute A Sample Code

1. The project can be run in Keil uVision4 MDK and above version.
2. Enter the SampleCode\ExampleCode\PD_INT_Wakeup\KEIL folder according to the Directory Information section and double-click PD_INT_Wakeup.uvproj to open the project.
3. Enter Keil compiler mode
   a. Build
   b. Download
   c. Enter / Exit Debug Mode
4. When in under Debug mode
   a. Free run

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