軟體偵測雜訊

NuMicro® 32 位系列微控制器範例代碼介紹

文件資訊

代碼簡述	I/O 檢測訊號時，使用系統計數器。在一定時間間隔內出現跳動，則不要反應動作，避免雜訊干擾。
BSP 版本	NUC123 Series BSP CMSIS v3.01.001
開發平台	NuTiny-EVB-123-LQFP64_V1.0

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1 功能介紹

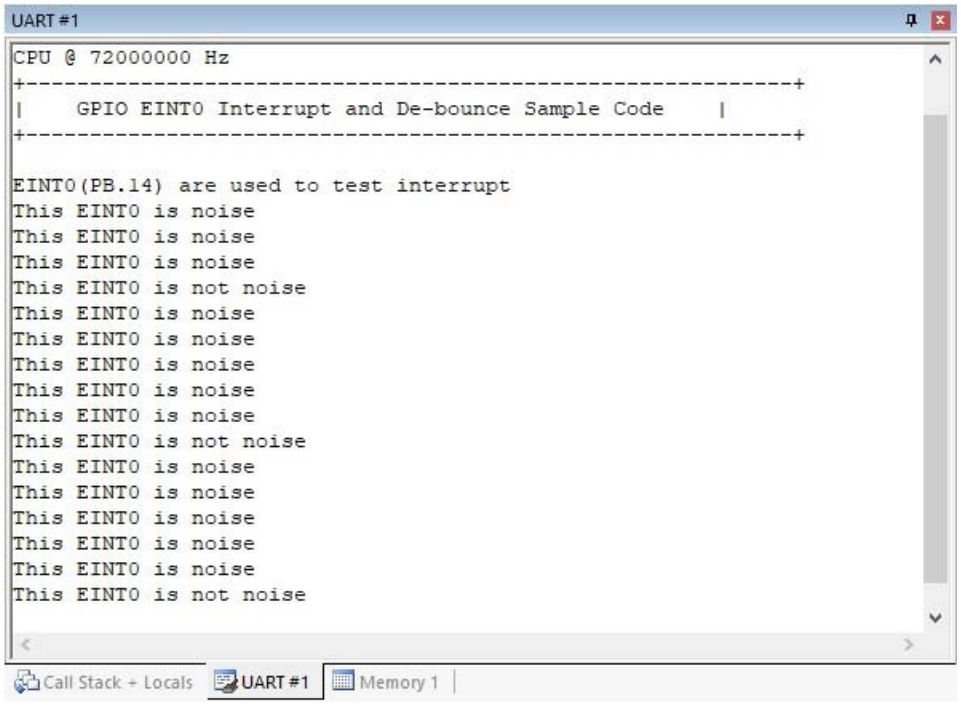
1.1 簡介

一般情況下，I/O偵測訊號時，很可能被雜訊干擾，而讓系統出現錯誤的反應。此範例是透過系統提供的計數器，把在一定時間間隔內出現的跳動，當成雜訊濾除，避免做出錯誤反應。

1.2 原理

在I/O偵測到訊號時，進入中斷服務程序，在中斷服務裡設定系統計數器(SysTick)。計數器計數一定時間間隔，在時間內偵測到的訊號變化視為雜訊。如果沒有偵測到變化則為正常訊號。

1.3 執行結果



2 代碼介紹

EINT0 中斷服務程式，清除中斷旗標與設定系統計數器，印出是否為雜訊：

```
void EINT0_IRQHandler(void){
    int i, deboundce=0;

    for(i=0;i<500;i++){
        /* For PB.14, clear the INT flag */
        GPIO_CLR_INT_FLAG(PB, BIT14);
        SysTick->LOAD = 1000*CyclesPerUs;
        SysTick->VAL  = 0;
        SysTick->CTRL = SysTick_CTRL_CLKSOURCE_Msk | SysTick_CTRL_ENABLE_Msk;

        /* Waiting for down-count to zero */
        while((SysTick->CTRL & SysTick_CTRL_COUNTFLAG_Msk) == 0) {
            if(PB14==1){
                PB13^=1;
                deboundce=1;
                printf("This EINT0 is noise\n");
                goto exit_int0;
            }
        }
    }

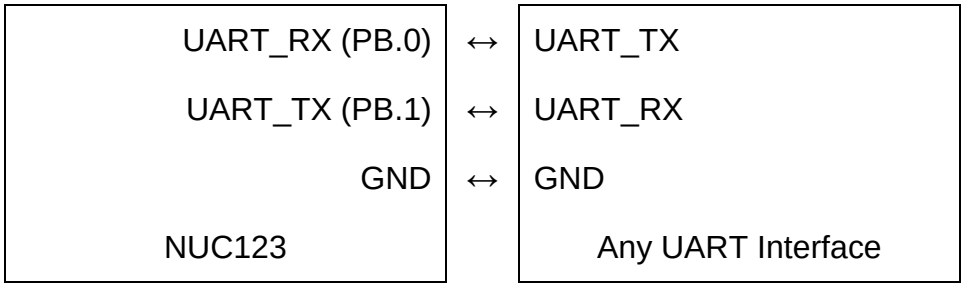
    if(deboundce==0){
        PB12^=1;
        printf("This EINT0 is not noise\n");
    }
exit_int0:
    return;
}
```

設定 PB.14 偵測外部訊號與對應的中斷服務程式：

```
/* Configure PB.14 as EINT0 pin and enable interrupt by falling edge trigger */
GPIO_SetMode(PB, BIT14, GPIO_PMD_QUASI);
GPIO_EnableEINT0(PB, 14, GPIO_INT_FALLING);
NVIC_EnableIRQ(EINT0_IRQn);
```

3 軟體與硬體環境

- **軟體環境**
  - BSP 版本
    - NUC123 Series BSP CMSIS v3.01.001
  - IDE 版本
    - Keil uVersion 5.26
- **硬體環境**
  - 電路元件
    - NuTiny-EVB-123-LQFP64_V1.0
  - 示意圖



4 目錄資訊

EC_NUC123_Software_Debounce_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 如何執行範例程式

1. 根據目錄資訊章節進入 ExampleCode 路徑中的 KEIL 資料夾，雙擊 NUC123_Software_Debounce.uvproj。
2. 進入編譯模式介面
   a. 編譯
   b. 下載代碼至記憶體
   c. 進入 / 離開除錯模式
3. 進入除錯模式介面
   a. 執行代碼

6 修訂紀錄

Date	Revision	Description
Oct. 24, 2019	1.00	1. 初始發佈.

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