Timer Trigger ADC and PDMA

NuMicro® 32 位系列微控制器範例代碼介紹

文件資訊

代碼簡述	利用 PDMA 的 channel 1 將 ADC 的 channel 0,1,2 所轉換出來的資料,搬到 SRAM 中
BSP 版本	Nano100B Series BSP CMSIS v3.03.000
開發平台	NuTiny-EVB-Nano130-LQPF128

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1 功能介紹

1.1 簡介

利用PDMA的channel 1將ADC的channel 0,1,2所轉換出來的資料,搬到SRAM中。

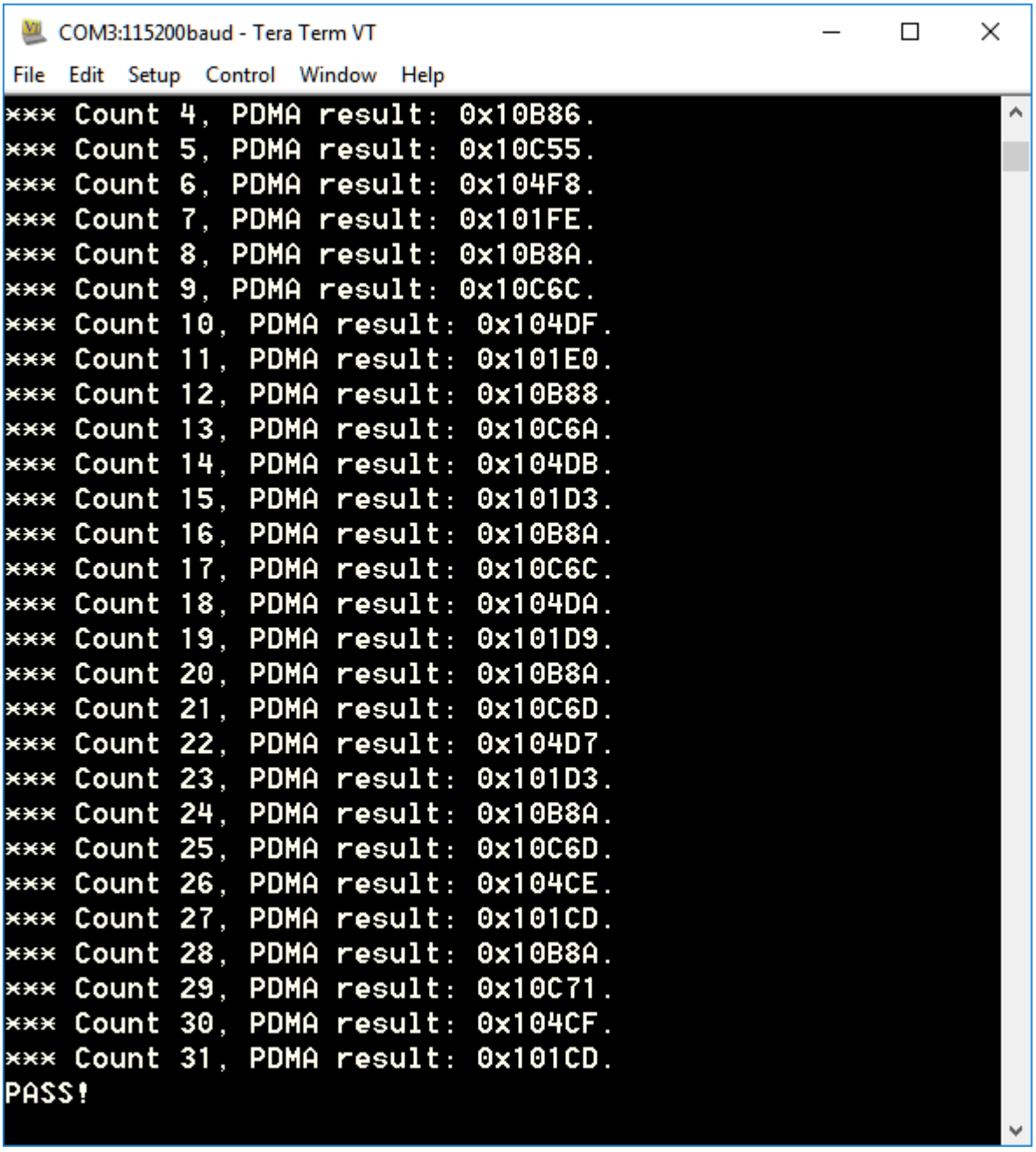
1.2 原理

利用timer每秒觸發一次ADC及PDMA功能。

PDMA每次將ADC的資料，從source array搬到destination array。

1.3 執行結果

執行結果，以及打印資料。


COM3:115200baud - Tera Term VT
File Edit Setup Control Window Help
*** Count 4, PDMA result: 0x10B86.
*** Count 5, PDMA result: 0x10C55.
*** Count 6, PDMA result: 0x104F8.
*** Count 7, PDMA result: 0x101FE.
*** Count 8, PDMA result: 0x10B8A.
*** Count 9, PDMA result: 0x10C6C.
*** Count 10, PDMA result: 0x104DF.
*** Count 11, PDMA result: 0x101E0.
*** Count 12, PDMA result: 0x10B88.
*** Count 13, PDMA result: 0x10C6A.
*** Count 14, PDMA result: 0x104DB.
*** Count 15, PDMA result: 0x101D3.
*** Count 16, PDMA result: 0x10B8A.
*** Count 17, PDMA result: 0x10C6C.
*** Count 18, PDMA result: 0x104DA.
*** Count 19, PDMA result: 0x101D9.
*** Count 20, PDMA result: 0x10B8A.
*** Count 21, PDMA result: 0x10C6D.
*** Count 22, PDMA result: 0x104D7.
*** Count 23, PDMA result: 0x101D3.
*** Count 24, PDMA result: 0x10B8A.
*** Count 25, PDMA result: 0x10C6D.
*** Count 26, PDMA result: 0x104CE.
*** Count 27, PDMA result: 0x101CD.
*** Count 28, PDMA result: 0x10B8A.
*** Count 29, PDMA result: 0x10C71.
*** Count 30, PDMA result: 0x104CF.
*** Count 31, PDMA result: 0x101CD.
PASS!

2 代碼介紹

設定 timer trigget ADC 及 timer interrupt：

```
// Set timer frequency to 1Hz
TIMER_Open(TIMER0, TIMER_PERIODIC_MODE, 1);
// Set Timer 0 time out to trigger ADC
TIMER_SetTriggerSource(TIMER0, TIMER_TIMEOUT_TRIGGER);
TIMER_SetTriggerTarget(TIMER0, TIMER_CTL_ADC_TEEN_Msk|TIMER_CTL_PDMA_TEEN_Msk);

// Enable timer interrupt
TIMER_EnableInt(TIMER0);
NVIC_EnableIRQ(TMR0_IRQn);
```

設定 PDMA 搬移 ADC 資料的功能：

```
void PDMA_INIT(void)
{
    uint32_t u32SrcAddr, u32DstAddr;

    /* Configure PDMA channel 1 to trigger ADC */
    PDMA_Open(1 << PDMA_CH);
    PDMA_SetTransferCnt(PDMA_CH, PDMA_WIDTH_32, ADC_TEST_COUNT);
    u32SrcAddr = (uint32_t)&ADC->PDMA;
    u32DstAddr = (uint32_t)g_au32RxPDMADestination;
    PDMA_SetTransferAddr(PDMA_CH, u32SrcAddr, PDMA_SAR_FIX, u32DstAddr, PDMA_DAR_INC);
    PDMA_SetTimeOut(PDMA_CH, 0, 0x5555);
    PDMA_EnableInt(PDMA_CH, PDMA_IER_TD_IE_Msk);
    NVIC_EnableIRQ(PDMA_IRQn);

    /* Set PDMA Channel 1 for ADC, and start timeout counting */
    PDMA_SetTransferMode(PDMA_CH, PDMA_ADC, 0, 0);

    PDMA_Trigger(PDMA_CH);
}
```

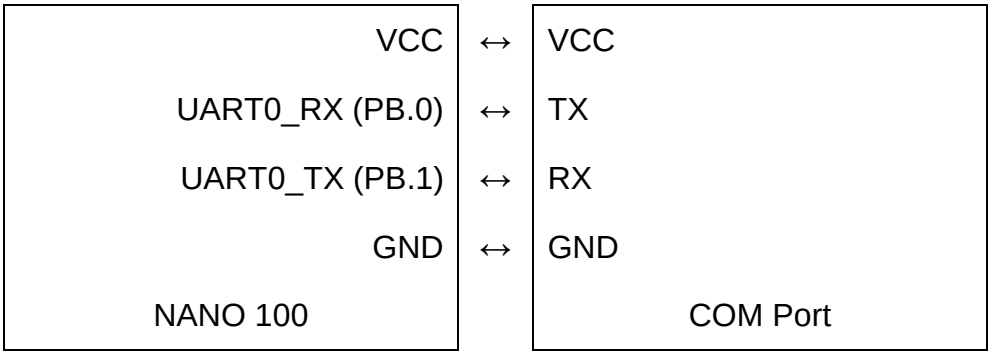
3 軟體與硬體環境

● 軟體環境

- ■ BSP 版本
  - ◆ Nano100B Series BSP CMSIS v3.03.000
- ■ IDE 版本
  - ◆ Keil uVersion 5.26

● 硬體環境

- ■ 電路元件
  - ◆ NuTiny-EVB-NANO130-LQPF128
- ■ 示意圖



4 目錄資訊

- EC_Nano100_TIMER_Trigger_ADC_PDMA
  - 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 Nano100_TIMER_Trigger_ADC_PDMA.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
Apr. 5, 2019	1.00	1. 初始發布.

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