NUC240使用I²C驅動MMA7455

NuMicro® 32 位系列微控制器範例代碼介紹

文件資訊

代碼簡述	本範例代碼使用NUC240的I²C驅動MMA7455
BSP 版本	NUC230_240 Series BSP CMSIS v3.01.001
開發平台	NuEdu-EVB-NUC240 v1.0

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1 功能介紹

1.1 簡介

本範例代碼使用I²C介面，去讀寫MMA7455暫存器，達成顯示加速度值的功能。本範例提供了2個API，讓使用者呼叫：

API	功能
Init_MMA7455_Reg()	初始化MMA7455暫存器
READ_MMA7455_ACCEL()	讀取三軸數位加速度感測器的值

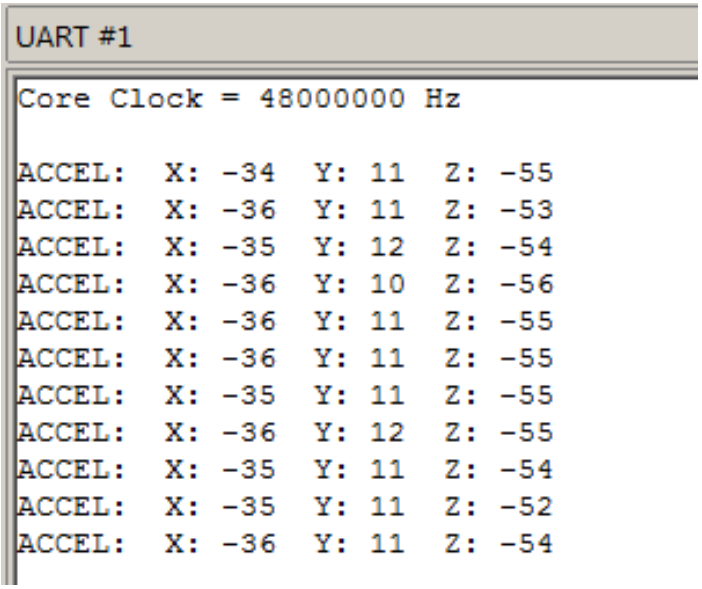
1.2 原理

MMA7455三軸數位加速度感測器模組規格：

- 低功耗 3 軸加速度計
- 電源電壓範圍：2.4 ~3.6 V
- 可選定測量範圍：±2 g, ±4 g, ±8 g
- 解析度可高達 10 bits (@ ±8 g)，通用為 8 bits 解析度
- 抗衝擊能力：5,000 g
- 使用 I²C 或 SPI 通訊介面
- 具敲擊檢測(單擊&雙擊)及移動等級檢測，可輸出中斷訊號
- 寬溫度範圍：−40 °C ~ 85 °C

1.3 執行結果

使用NUC240 I²C介面進行設定MMA7455 G-Sensor模塊，以及傳輸MMA7455三軸數位加速度感測器所量測到的加速度數值，可以用重力加速度在三軸的分量大小來判斷目前感測器的傾斜角度。編譯專案並進入除錯模式執行程式，除錯訊息會列印在Serial Window UART #1。



2 代碼介紹

2.1 初始化 MMA7455

Init_MMA7455_Reg() 此函式主要工作為初始化MMA7455暫存器的值。MMA7455協定請參考產品規格手冊。

```
void Init_MMA7455_Reg(void)
{
    MMA7455_Write(MMA7455,MMA7455_MCTL, 0x05);
    MMA7455_Write(MMA7455,MMA7455_XOFFL, 0xF8);
    MMA7455_Write(MMA7455,MMA7455_XOFFH, 0xFF);
    MMA7455_Write(MMA7455,MMA7455_YOFFL, 0x26);
    MMA7455_Write(MMA7455,MMA7455_YOFFH, 0x00);
    MMA7455_Write(MMA7455,MMA7455_ZOFFL, 0xD8);
    MMA7455_Write(MMA7455,MMA7455_ZOFFH, 0xFF);
}
```

2.2 讀取 MMA7455 三軸數位加速度值

READ_MMA7455_ACCEL()此函式主要工作為讀取MMA7455暫存器的值。MMA7455協定請參考產品規格手冊。

```
void READ_MMA7455_ACCEL(void)
{
    MMA7455_X=(int8_t)MMA7455_Read(MMA7455,MMA7455_XOUT8);
    MMA7455_Y=(int8_t)MMA7455_Read(MMA7455,MMA7455_YOUT8);
    MMA7455_Z=(int8_t)MMA7455_Read(MMA7455,MMA7455_ZOUT8);
}
```

3 軟體與硬體環境

● 軟體環境

■ BSP 版本

- ◆ NUC230_240 Series BSP CMSIS v3.01.001

■ IDE 版本

- ◆ Keil uVersion 4.74

● 硬體環境

■ 電路元件

- ◆ NuEdu-EVB-NUC240 V1.0
- ◆ MMA7455

■ 示意圖

NUC240使用I^2C腳位讀寫MMA7455的暫存器值。

I2C1_SCL (PA.11)	↔	SCL (Pin 14)
I2C1_DAT (PA.10)	↔	SDA (Pin 13)
NuEdu-SDK-NUC240		MMA7455

4 目錄資訊

- EC_ NUC240_I2C_MMA7455_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
    - NuEdu — Library for NuEdu-SDK-NUC240 board
    - 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 NUC240_I2C_MMA7455.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
Nov. 1, 2019	1.00	1. 初始發布

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