NUC240使用I²C驱动MMA7455

NuMicro® 32 位系列微控制器范例代码介绍

文件信息

代码简述	本范例代码使用NUC240的I²C驱动MMA7455
BSP 版本	NUC230_240 Series BSP CMSIS v3.01.001
开发平台	NuEdu-EVB-NUC240 v1.0

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1 功能介绍

1.1 简介

本范例代码使用I²C接口，去读写MMA7455缓存器，达成显示加速度值的功能。本范例提供了2个API，让使用者呼叫：

API	功能
Init_MMA7455_Reg()	初始化MMA7455缓存器
READ_MMA7455_ACCEL()	读取三轴数位加速度传感器的值

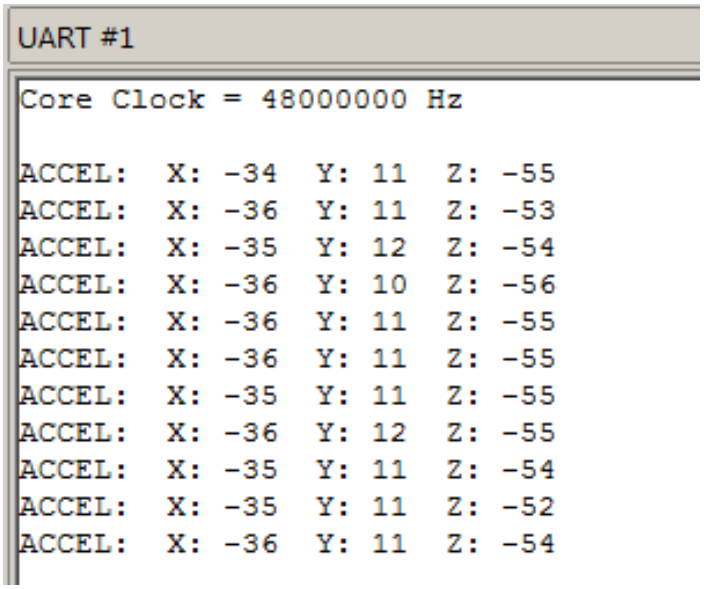
1.2 原理

MMA7455三轴数字加速度传感器模块规格：

- 低功耗 3 轴加速度计
- 电源电压范围：2.4 ~3.6 V
- 可选定测量范围：±2 g, ±4 g, ±8 g
- 分辨率可高达 10 bits (@ ±8 g)，通用为 8 bits 分辨率
- 抗冲击能力：5,000 g
- 使用 I²C 或 SPI 通讯接口
- 具敲击检测(单击&双击)及移动等级检测，可输出中断讯号
- 宽温度范围：−40 °C ~ 85 °C

1.3 执行结果

使用NUC240 I²C接口进行设定MMA7455 G-Sensor模块，以及传输MMA7455三轴数字加速度传感器所量测到的的加速度数值，可以用重力加速度在三轴的分量大小来判断目前传感器的倾斜角度。编译项目并进入除错模式执行代码，除错讯息会打印在串口窗口 UART #1。


UART #1
Core Clock = 48000000 Hz
ACCEL: X: -34 Y: 11 Z: -55
ACCEL: X: -36 Y: 11 Z: -53
ACCEL: X: -35 Y: 12 Z: -54
ACCEL: X: -36 Y: 10 Z: -56
ACCEL: X: -36 Y: 11 Z: -55
ACCEL: X: -36 Y: 11 Z: -55
ACCEL: X: -35 Y: 11 Z: -55
ACCEL: X: -36 Y: 12 Z: -55
ACCEL: X: -35 Y: 11 Z: -54
ACCEL: X: -35 Y: 11 Z: -52
ACCEL: X: -36 Y: 11 Z: -54

2 代码介绍

2.1 初始化 MMA7455

Init_MMA7455_Reg() 此函式主要工作为初始化MMA7455缓存器的值。MMA7455协议请参考产品规格手册。

```
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 读取 MMA7455 三轴数位加速度值

READ_MMA7455_ACCEL()此函式主要工作为读取MMA7455缓存器的值。MMA7455协议请参考产品规格手册。

```
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 软件与硬件环境

- 软件环境
  - BSP 版本
    - NUC230_240 Series BSP CMSIS v3.01.001
  - IDE 版本
    - Keil uVersion 4.74
- 硬件环境
  - 电路组件
    - NuEdu-EVB-NUC240 V1.0
    - MMA7455
  - 示意图

    NUC240使用I^{2}C脚位读写MMA7455的缓存器值。

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

4 目录信息

- 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 如何执行范例程序

1. 根据目录信息章节进入 ExampleCode 路径中的 KEIL 文件夹，双击 NUC240_I2C_MMA7455.uvproj。
2. 进入编译模式接口
   a. 编译
   b. 下载代码至内存
   c. 进入 / 离开除错模式
3. 进入除错模式接口
   a. 执行代码

6 修订纪录

Date	Revision	Description
Nov. 1, 2019	1.00	1. 初始发布

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