NUC240实现ADC中值滤波器

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实现中值滤波器过滤ADC噪声
BSP 版本	NUC230_240 Series BSP CMSIS v3.01.001
开发平台	NuEdu-EVB-NUC240 v1.0

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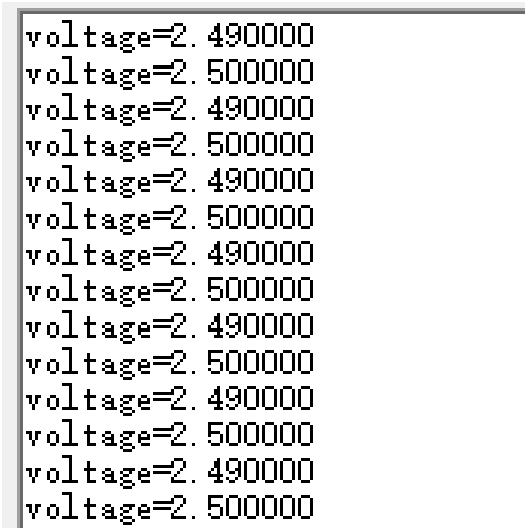
1 功能介绍

1.1 简介

此代码用一个简易的中值滤波器来过滤ADC噪声。ADC连续取样数据5次，将数据排序后，取出中间值，即为滤波后结果。

1.2 执行结果

使用NuEdu-EVB-NUC240与NuEdu-Basic01连接，转动NuEdu-Basic01的可变电阻，NUC240 ADC通道0连续取样5次并将数据做排序后取出中间值，即为结果。编译项目并进入除错模式执行代码，过滤结果会打印在串口窗口 UART #1。



2 代码介绍

2.1 中值滤波器

ADC连续取样5次数据，将数据作排序后，取出中间值，即为滤波后结果。

```
while (1)
{
    /* ADC value range: 0 ~ 4095 */
    g_au32Buffer[g_u32l] = Get_ADC_Knob();

    /* select sort */
    if (g_u32l == 5)
    {
        for (g_u32i = 1; g_u32i <= 3; g_u32i++)
        {
            g_u32k = g_u32i;

            for (g_u32j = g_u32i + 1; g_u32j <= 5; g_u32j++)
            {
                if (g_au32Buffer[g_u32j] < g_au32Buffer[g_u32k])
                    g_u32k = g_u32j;
            }

            if (g_u32k != g_u32i)
            {
                g_au32Buffer[0] = g_au32Buffer[g_u32i];
                g_au32Buffer[g_u32i] = g_au32Buffer[g_u32k];
                g_au32Buffer[g_u32k] = g_au32Buffer[0];
            }
        }

        g_u32l = 0;

        /* ADC value to voltage value */
        d_newVoltage = (3.27 / 4095.0) * g_au32Buffer[3];

        /* round to two decimal places */
        d_newVoltage = (double)((int)(d_newVoltage * 100) / 100.0);
```

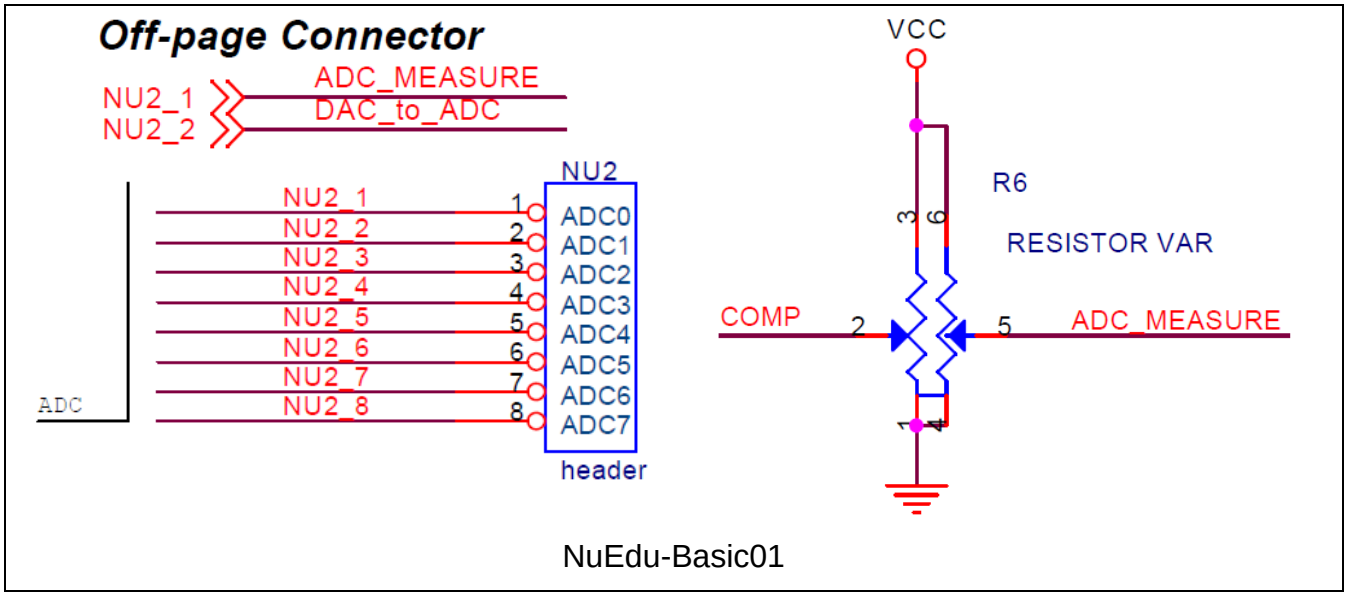
```
        if (d_newVoltage != d_oldVoltage)
        {
            printf("voltage=%f\n\r", d_newVoltage);
            d_oldVoltage = d_newVoltage;
        }
    }

     g_u32l++;
}
```

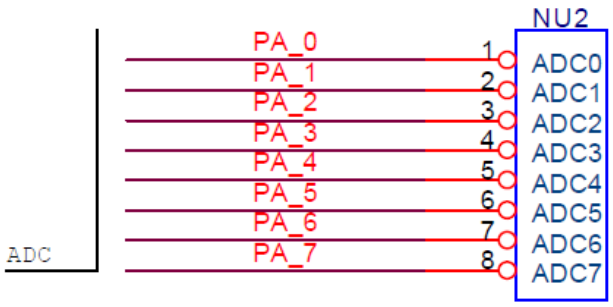
3 软件与硬件环境

- 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
    - NuEdu-Basic01
  - 示意图

    将 NuEdu-EVB-NUC240 与 NuEdu-Basic01 连接如下图显示。



NuEdu-Basic01



NuEdu-SDK-NUC240

4 目录信息

- EC_NUC240_ADC_Median_Filter_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_ADC_Median_Filter.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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