The driver of TLC2543

Example Code Introduction for 8-bit NuMicro®Family

Information

Application	This sample code reads the A/D conversion data of TLC2543 based on MS51 series.
BSP Version	MS51_Series_BSP_Keil_V1.00.002
Hardware	NuTiny-MS51FB V1.1

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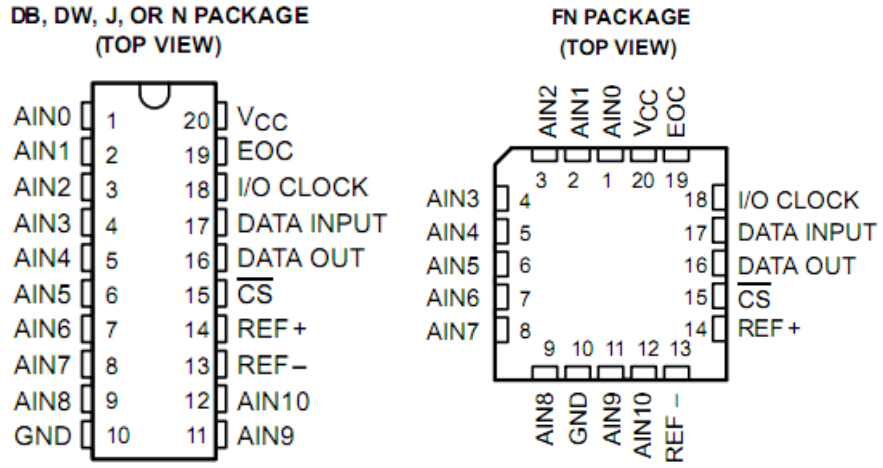
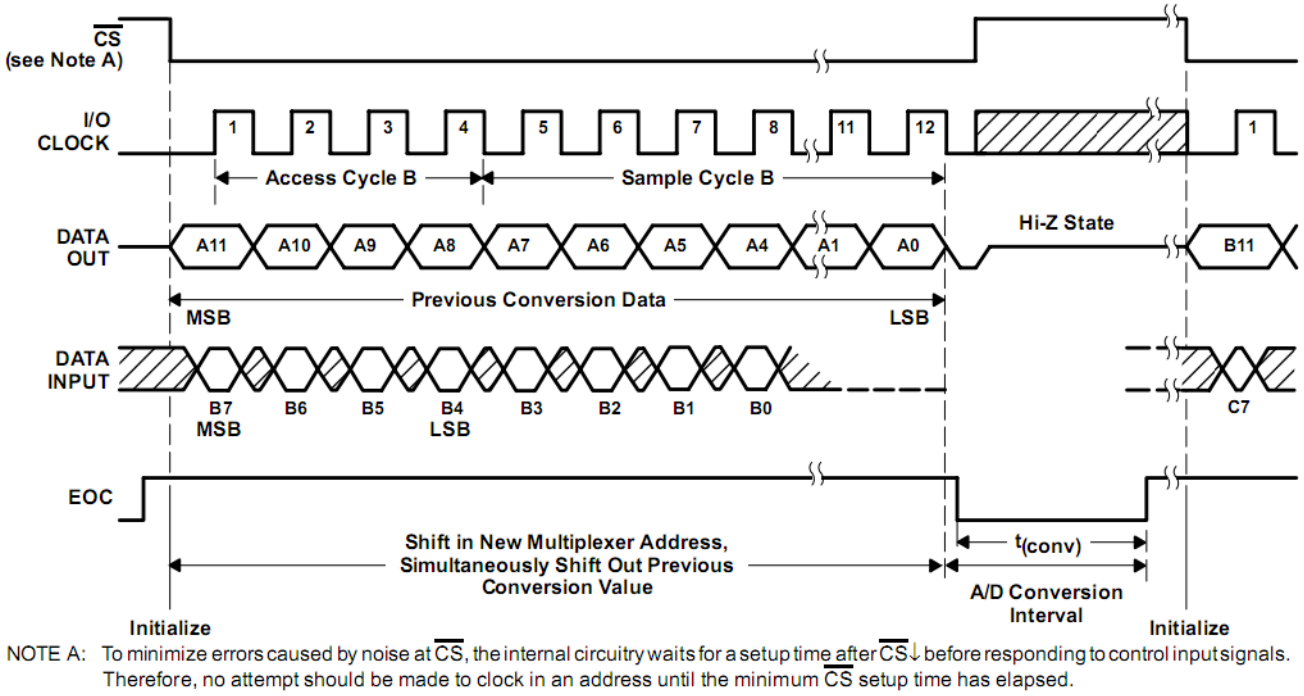
1 Function Description

1.1 Introduction

TLC2543 is a 12-bit resolution A/D converter, with 11 analog input channels. The pin configuration of TLC2543 as shown below.



This sample code uses GPIO to achieve the read-write timing sequence of TLC2543 based on MS51 series, and prints the ADC value sampled by TLC2543 through serial port. The reading and writing timing sequence of TLC2543 is as follows.



NOTE A: To minimize errors caused by noise at $\overline{CS}$, the internal circuitry waits for a setup time after $\overline{CS}\downarrow$ before responding to control input signals. Therefore, no attempt should be made to clock in an address until the minimum $\overline{CS}$ setup time has elapsed.

Figure 9. Timing for 12-Clock Transfer Using $\overline{CS}$ With MSB First

Note: For more information about TLC2543, please refer to the datasheet of TLC2543.

1.2 Demo Result

```
+-----------------------------------------------------------+
|   TLC2543 Driver                                          |
+-----------------------------------------------------------+
The ADC data is: 0x872
The ADC data is: 0x870
The ADC data is: 0x877
The ADC data is: 0x86a
The ADC data is: 0x875
The ADC data is: 0x873
The ADC data is: 0x86f
The ADC data is: 0x867
The ADC data is: 0x86a
The ADC data is: 0x870
The ADC data is: 0x875
The ADC data is: 0x86d
The ADC data is: 0x86f
```

2 Code Description

This code uses GPIO to achieve the read-write timing sequence of TLC2543, and reads its A/D conversion value.

```
/**
  * @brief Read the conversion data of TLC2543.
  *
  * @param[in] u8Channel define the conversion channel, from 0~11.
  *
  * @return  The conversion data. It is the previous conversion data.
*/
uint16_t TLC2543_Read(uint8_t u8Channel)
{
    uint16_t u16DataOut = 0;
    uint16_t u16DataIn = 0;
    uint8_t i = 0;

    u16DataOut = ((uint16_t)u8Channel) << 12;

    TLC2543_CS = 0;

    for(i = 0; i < 12; i++)
    {
        TLC2543_CLK = 0;
        TLC2543_DIN = (bit)(u16DataOut & 0x8000);
        u16DataOut <<= 1;
        TLC2543_Delay();
        TLC2543_CLK = 1;
        u16DataIn <<= 1;
        if(TLC2543_DOUT == 1)
        {
            u16DataIn |= 0x01;
        }
        TLC2543_Delay();
    }

    TLC2543_CLK = 0;
    TLC2543_Delay();
    TLC2543_CS = 1;
    TLC2543_Delay();
```

```
    while(TLC2543_EOC == 0);

    return u16DataIn;
}
```

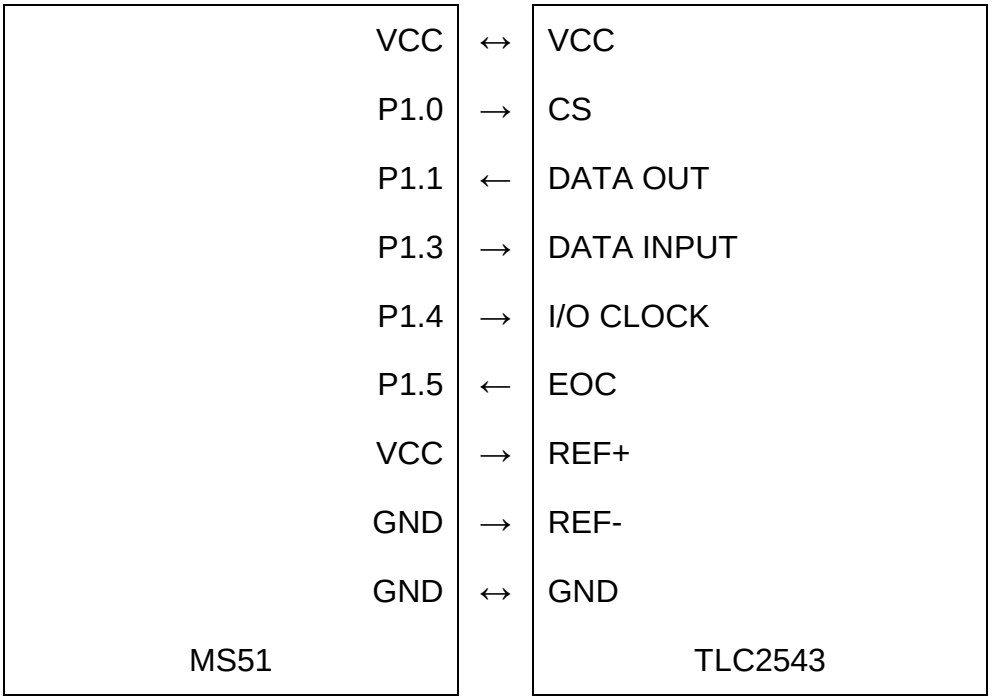
3 Software and Hardware Environment

Software Environment

- BSP version
  - MS51_Series_BSP_Keil_V1.00.002
- IDE version
  - Keil uVersion 4.72

Hardware Environment

- Circuit components
  - NuTiny-MS51FB V1.1
  - TLC2543
- Diagram



4 Directory Information

- EC_MS51_TLC2543_V1.00
  - Library — Sample code header and source files
    - Device — MCU header files
    - Startup — MCU Startup file
    - StdDriver — All peripheral driver header and source files
  - SampleCode
    - ExampleCode — Source file of example code

5 How to Execute Example Code

1. Browsing into sample code folder by Directory Information(section 4) and double click TLC2543.uvproj.
2. Enter Keil compile mode
   a. Build
   b. Download
   c. Start/Stop debug session
3. Enter debug mode
   a. Run

6 Revision History

Date	Revision	Description
Sep.25, 2019	1.00	1. Initially issued.

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