NUC240 Control Servomotor

Example Code Introduction for 32-bit NuMicro® Family

Information

Application	NUC240 output PWM waveform for controlling servomotor
BSP Version	NUC230_240 Series BSP CMSIS V3.01.001
Hardware	NuEdu-EVB-NUC240 V1.0

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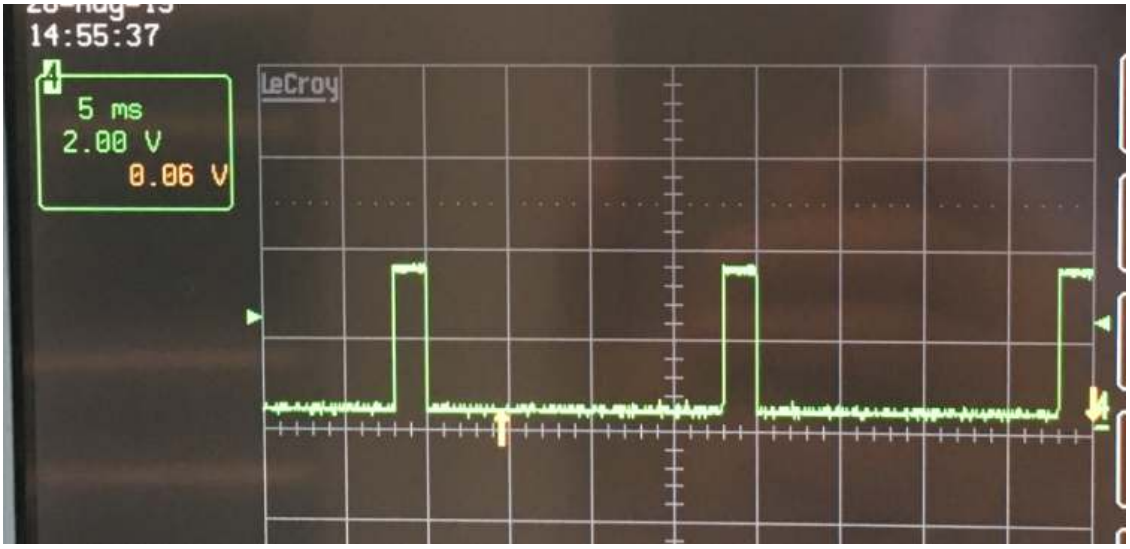
1 Function Description

1.1 Introduction

PWM0 of NUC240 can output a 50Hz waveform to control a servomotor. If you rotate the wheel on NuEdu-EVB board, value of ADC0 could change. Then, high level of waveform outputting form PWM0 changed from 1ms to 2ms. This waveform is just the signal control a servomotor.

1.2 Demo Result

The following waveform is display on oscilloscope if you execute this project on NuEdu-EVB board and test PWM0 waveform. High level will change from 1ms to 2ms if rotating the wheel on NuEdu-EVB board. Period is 20ms constantly.



2 Code Description

The following code is that initiate pin, clock and PWM peripheral.

```
void Initial_Servo(void)
{
    /* Set PA12~PA14 multi-function pins for PWMA Channel0~2  */
    SYS->GPA_MFP = SYS_GPA_MFP_PA12_PWM0 ;
    SYS->ALT_MFP1 = SYS_ALT_MFP1_PA12_PWM0 ;

    /* Enable clock of PWM module */
    CLK_EnableModuleClock(PWM01_MODULE);

    /* Select PWM module clock source */
    CLK_SetModuleClock(PWM01_MODULE, CLK_CLKSEL1_PWM01_S_HXT, 0);

    /* Configure PWM0 output 50Hz waveform */
    PWM_ConfigOutputChannel(PWMA, PWM_CH0, 50, 0);
    PWM_EnableOutput(PWMA, 0x01);

    /* Start PWM */
    PWM_Start(PWMA, 0x01);
}
```

Following code is that value of ADC0 control duty of PWM0

```
int main(void)
{
    unsigned int temp;

    /* Init System */
    SYS_Init();

    /* Init ADC0 */
    Open_ADC_Knob();

    /* Init PWM0 */
    Initial_Servo();

    while (1)
    {
        temp = Get_ADC_Knob();                  // Get knob value, Range: 0 ~ 4095
```

```
        temp = temp * (3000) / 4096;            // Calculate duty data of PWM
        PWMA->CMR0 = 2999 + temp;               // Write duty data into register
    }
}
```

3 Software and Hardware Environment

Software Environment

- BSP version
  - NUC230_240 Series BSP CMSIS V3.01.001
- IDE version
  - Keil uVersion 5.26

Hardware Environment

- Circuit components
  - NuEdu-EVB-NUC240 V1.0
- Diagram

  Please to reference NuEdu-EVB-NUC240 V1.0 board

4 Directory Information

NUC240_NuEdu_ServoMotor_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-xxxx board
SmartcardLib	Smartcard library binary and header 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, double click NUC240_NuEdu_ServoMotor.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
Apr. 5, 2019	1.00	1. Initially issued.

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